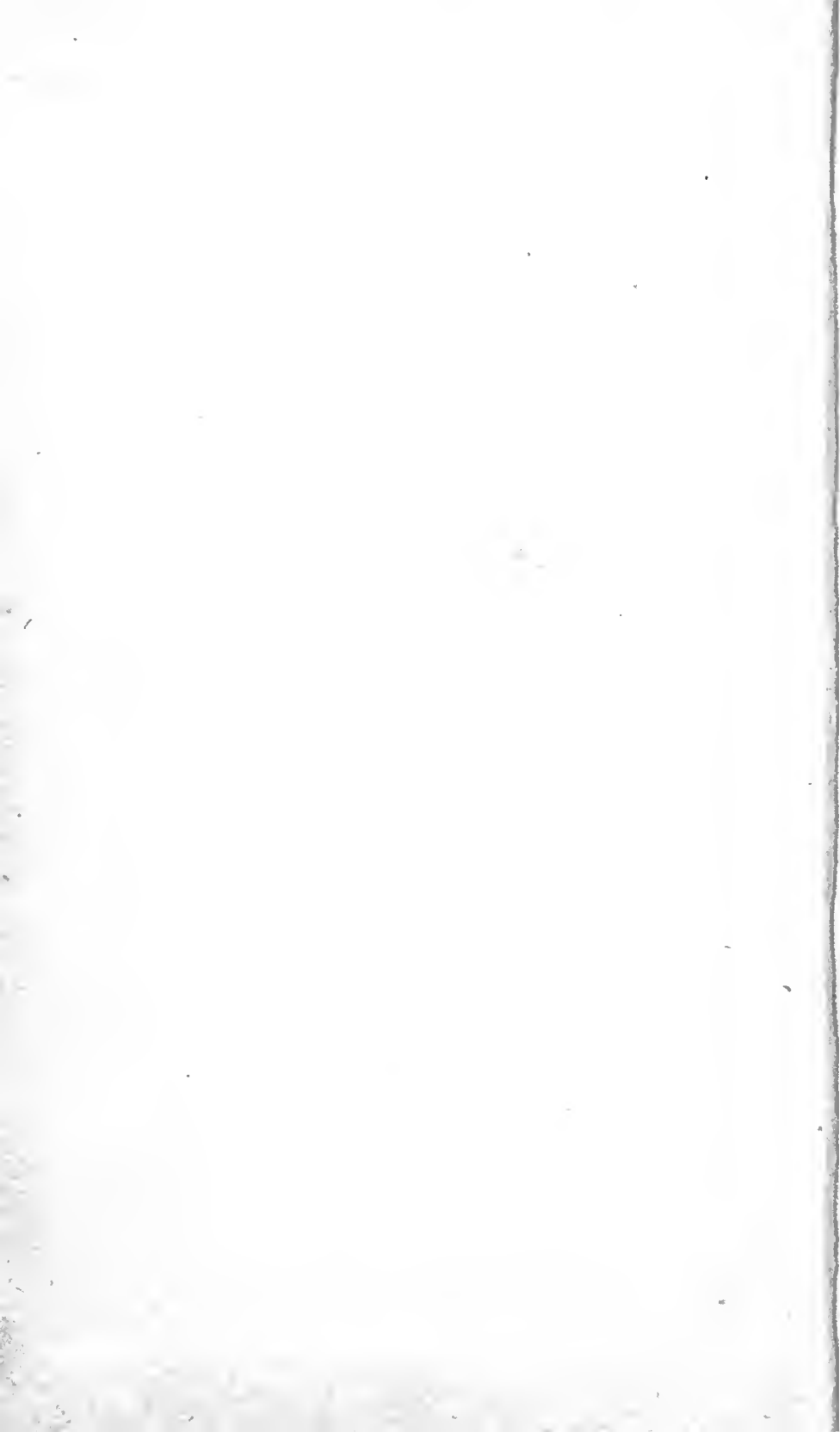


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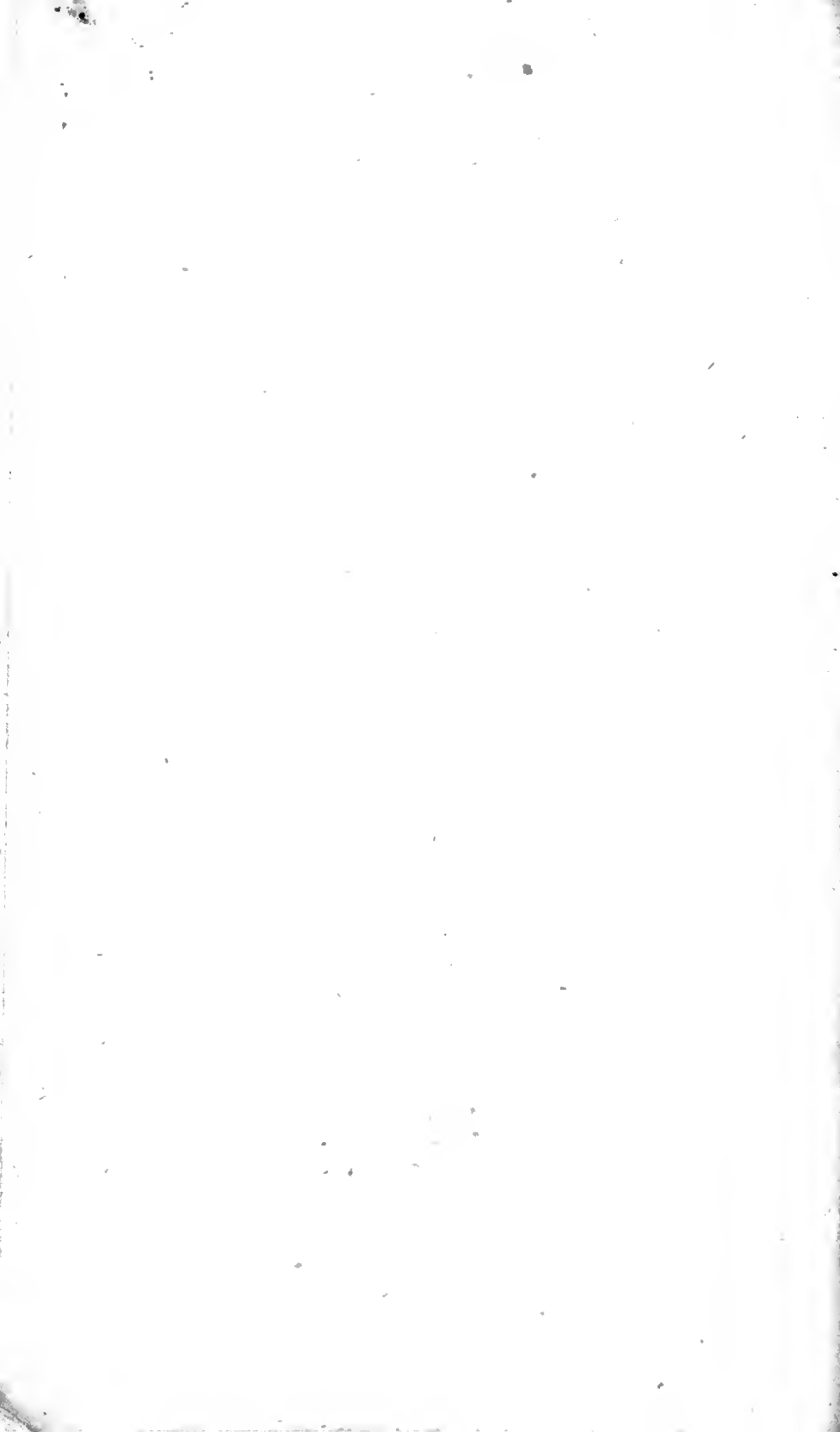
1874.
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VICTORIA.

REPORT
ON THE
PHYSICAL CHARACTER AND RESOURCES
OF
GIPPSLAND.

BY THE
SURVEYOR-GENERAL AND THE SECRETARY FOR MINES;
WITH A MAP AND GEOLOGICAL SECTIONS.

SECOND EDITION.

MELBOURNE:
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REPORT.

TO THE HONORABLE J. J. CASEY, M.P., MINISTER OF LANDS
AND AGRICULTURE, ETC., ETC., ETC.

Melbourne, 10th February 1874.

SIR,

In obedience to your instructions we submit the results of the observations made by us when we had the honor to accompany His Excellency Sir George Bowen, the Governor of the Colony, and yourself in your tour through Gippsland. In order to a proper understanding of the statements which follow, it is necessary to give a brief description of this part of the colony.

Gippsland extends from longitude $145^{\circ} 50'$ on the west to longitude 150° on the east. It is bounded on the west by the eastern boundaries of the counties of Evelyn and Mornington; on the north and north-west by the Great Dividing Range; on the north-east by a line from Forest Hill to Cape Howe, dividing Victoria from New South Wales; and on the south-east and south by the sea.

The area of the tract is 13,898 square miles, or 8,894,720 acres. It may be regarded as bounded on the north-west and west by the Cordillera, and on the south-east by the sea.

Its extreme length from west to east is two hundred and fifty miles, and its mean breadth about eighty miles.

Excepting the La Trobe, which runs from west to east, all the great rivers have excavated deep valleys at right-angles to the coast-line. These rivers have their sources in mountains and plateaux, which, over the greater part,

are covered with snow during nine months in the year ; their tributaries are perennial streams, flowing over beds of pebbles, boulders, and bars of hard rock, resembling the trout streams of Scotland. Owing to the direction of the great valleys being at right-angles to the coast-line, the climate, even on the sea-coast, is generally cool and agreeable ; and the moisture-laden winds, which have uninterrupted course along the valleys, are cast upwards into colder air when they encounter the Dividing Range, and there precipitation is constant. Even in the height of summer, snow lies for weeks in the deep recesses of the mountains, and when it is melted the bright-green of the sub-alpine flora marks the sites it has occupied. Chains of hills and spurs, offshoots of the great range, border the valleys, the culminating points of some of which attain a height of 5300 feet. The highest indicates, however, only the altitude of the great plain, for the most part covered with newer volcanic rocks overlying tertiary gravels, which once extended from Mount Useful on the west to the Snowy River on the east. The rivers fed by the snow and the rains have broken up this once great plateau ; they have cut deeply into the hard rocks ; they have carried downwards towards and into the sea vast quantities of sand, mud, and slime, and the evidences of their work are found in the low level tracts of tertiary sands and clays which extend from the Moe Swamp on the west to Ram Head on the east. Work similar to that which they have done can be seen in any wayside torrent. But because of the grandeur of the sculpture in the mountain ranges, the mind is slow to recognise them as the agents. The mind, untaught by experience, would seek rather in unknown plutonic forces the agents which reared the lofty peaks and ranges that

appear as irregular as the waves of the ocean in a storm when beheld from a great height.

The loftiest mountain height is, however, no more than a measure of the extent of the denudation to which the plateau has been subjected within the tertiary period.

The spurs from the great ranges east of the southern extension of the Cordillera disappear as we approach the coast. There are no hills of any considerable height within ten to fifteen miles of it.

Bordering the Ninety-mile Beach there are large lakes in an extensive area of flat country. It is probable that at one time, and when the land had not the same configuration as now, each lake had its separate outlet to the sea. At the present time Lake Wellington, Lake Victoria, and Lake King, which may be regarded rather as the expansion of rivers than true lakes, discharge their surplus waters at a point fifty miles east of Lake Wellington. Between the lakes and the sea there is a tract of sandy country, varying in breadth from a few hundred yards to one mile, the sea-margin of which shifts with the winds. At the entrance to the sea this tract narrows to a single line of sand-dunes, not more than two hundred yards wide, and across the entrance there is a shifting bar.* Along this coast, in great floods, sufficient to overcome the stress of the storm-beaten sea, new mouths are opened, if not in the lakes, certainly in the rivers. The Snowy River has shifted its mouth many times. In periods of

* As might be expected, the lakes are shallower than the larger rivers which run into them.

When the bar at the entrance is closed—and it is sometimes closed during heavy easterly gales—the water rises to a great height in the lakes, and the country for a distance of one hundred miles back is flooded. It was the custom of the settlers to cut through the bank when the flood had attained its maximum height, and the rush of waters very quickly cleared a channel, through which even large vessels could sail in.—*Report of the late Mr. Dawson, 1st February 1855.*

flood it has again and again sought its old, direct, and natural course to the sea ; but, during the prevalence of south-westerly weather, there are heaped up sand and weed against the natural mouth, and finally it disembogues some seven miles from its proper outlet. It too, has a bar of sand at its mouth. The prevailing winds have a tendency to shift the mouths of all the streams towards the east.

The great height above the sea of a considerable portion of Gippsland, the relatively large proportion of water to land-surface, the form and direction of the great valleys, and the dense foliage that clothes the upland slopes, temper the heats of summer, and indirectly by their agency confer fertility on soils that in other parts of Victoria would be regarded as scarcely suitable for cultivation.

The great ranges on the north-west are not the only barriers which separate Gippsland from the remainder of the colony. The way by sea is uncertain, and in bad weather insecure, because of the difficulty of effecting an entrance into the lakes ; and the track from Melbourne towards Sale is almost impracticable in winter. Where the track crosses a patch of older volcanic rock a little to the east of the Buneep the soils are deep, and in wet weather almost prevent the passage of wheeled vehicles. The spot is well known as the "Glue-pot."

And on entering Gippsland, if the traveller should seek to explore the carbonaceous tract extending towards Corner Inlet, or the summits of the ranges bordering the principal rivers, he would find his course stopped by scrubs and thickets so dense that only a well-equipped party would be able to advance a mile or two in the day.

Gippsland, indeed, since the foundation of the colony, though in area nearly one-ninth of Victoria, has been

practically cut off from regular and ready communication with the capital and with other parts of the Province ; the character of its soils has not been made known, its resources have been hidden, its climate has been but imperfectly investigated ; and the settler has been debarred from entering it because of the difficulties of the road and his want of knowledge of its adaptation for culture.

For a long period after the first entry of settlers into Gippsland—which took place in 1838—the only practicable route for stock was south-westwards from New South Wales*. The lofty ranges of the Cordillera were not

* Andrew Hutton, a man well known in Gippsland, travelled in 1838 from Nangutta on the Genoa River to the entrance to the lakes with 500 head of cattle and five men. They travelled along the coast, crossing the mouth of the Snowy River. They stayed at the entrance about a week, the natives hunting the party all the time, and finally driving them away and killing the cattle.

Some two years after McMillan came in from Omeo and Count Strzelecki came down on McMillan's tracks.

Wilkinson took up Buchau with 100 head of cattle immediately before McMillan came down. About the same time McIntyre took up Gelantipy, also before McMillan arrived.

When Hutton was hunted away from the entrance, at the time of his first arrival, he found the wreck of the schooner *Shaw*, trading from Sydney to Hobart Town. He buried either four or five of the sailors. This was near the Wingan River.—*From information furnished to Alfred W. Howitt, Esq., P.M., by Andrew Hutton, 17th February 1874.*

The following additional information respecting the first occupation of Gippsland has been furnished to Mr. Howitt by Mr. John Campbell Macleod, formerly of Bairnsdale and late of Ensay :—

"McMillan passed through Maneroo in May 1839 on his way to form Numlamungee (the old name for Ensay), on the Tambo River, as a cattle station for Laehlan and Mathew McAlister, of Clifton, N.S.W.

"From what the blacks told him at Omeo, he went to Gippsland in 1840 with Big Johnny and Ingubiri and Friday down a native track to Bruthen ; this is where the road is now. They then struck the Nicholson River below the bridge.

"The party consisted of Angus McMillan, Mathew McAlister, Angus Cameron, and Thomas Bath.

"These were not the first people, *i.e.*, whites, who got into Gippsland. A black-fellow, of Sale tribe, called Malabar, told me that three whitefellows with kangaroo dogs and guns, made their way to Buchanan's, on Lake Wellington. They fired at the blacks, who surrounded them and killed them ; they are said to be buried at the head of a little salt-water creek, on the lower road to Port Albert, near

attempted by explorers for many years, and the now well-known track from Melbourne to Sale was opened only after many unsuccessful trials. Even at the present time this

McLennan's straits, on the left hand of the road, about two miles from Buchanans. —*See Port Phillip Patriot* from 1841.

"They attacked the whites early in the morning and killed two, and followed the other and killed him at Doughboy Flat.

"This seems to have been two or three years before McMillan came down; Malabar described it as being three 'warms' before the 'whitefellows' settled at the place now called Nuntin.

"I remember in 1857 several bushrangers were in Maneroo, and came down in this direction—that is, they were last heard of at Willis, on the Snowy River, the outside station at that time.

"1st. McMillan first of all came down.

"2nd. McMillan formed Nuntin, Beysdale, Maffra, and Bushy Park, and with him Dr. Arhuckle and Tom McAlister formed Mewburn Park.

"3rd. Then Old McFarlane formed Heyfield.

"4th. Then Brodribb formed the Ridge with Reeves' sheep.

"Curlewis and McLennan formed the Heart station. It was called the Heart from their finding a heart ent in the ground. McMillan's party found pieces of a bible at the same place; it is not known how this heart was ent there.

"When the *Clonmel* was wrecked the crew made into what is now Port Albert, and reported when reaching Melbourne that they had found a splendid harbor and a beautiful country.

"Messrs. J. Orr, Wentworth, Rankin, Macleod, and seven others chartered the *Singapore* and came to Port Albert, and formed a store at what is now called the Old Port, and left John Campbell (now of Glencoe) in charge. After coming up towards where Sale is, one part of the company went overland to Melbourne, and the rest returned in the *Singapore*. They had with them a Sydney black named Charley Tarra, who had been through with Count Strzelecki, in whose track Charley Tarra took them to Melbourne. The Tarra River is called after him. This company took up a special survey of over 5,000 acres where Alberton now is.

"I remember dining with Count Strzelecki at John King's, at Lake George. I think it was the beginning of 1840. He followed McMillan's track into Gippsland, and stayed with them at Nuntin.

"When I saw him at Lake George he was proposing to travel down the Murrumbidgee, and thence to Melbourne; afterwards he heard of McMillan, and followed his track and re-named all McMillan's rivers.

"I saw McMillan's party about May 1839 at the Jew's Flat (on Maneroo, N.S.W.) on their way, and I had heard privately of McMillan's discovery of Gippsland before I saw Strzelecki at King's.

"In 1842 Raymond came over the Gib and occupied Stratford; Jones occupied Lucknow. About the same time Fred. Taylor, mate of J. D. Smith, occupied Lindenow. In April 1844 A. Macleod occupied Bairnsdale. All came in from Maneroo, N.S.W.

immense and fertile tract is usually approached only by three routes—that from Melbourne to Sale, that from Maneroo in New South Wales, and that from Omeo to Bairnsdale.

“In 1846 P. C. Buckley left Tongco and occupied Prospect, where Merriman’s Creek runs into the sea.

“In 1841 McDonnell Glengary formed Woodside.

“The first cattle were shipped in 1842 from Port Albert to Tasmania; and provisions were brought round by that place from Sydney for McMillan’s party; before that all the supplies used to be carried from Maneroo *via* Omeo and Bruthen to Nuntin.

“Bruthen was called Toulon by McMillan. Kilmore was called Toulouse.

“In 1838, early in the year, Edward Baylis, on behalf of Kenworthy and Lord, travelled down through Willis, Suggan Buggan, Woolgulmerang, Gelantipy, Murrindal, to Buchan; when he got back to Maneroo he gave such a glowing description of it that John Rhodes Wilkinson, who then rented the Honorable Fraser Mowatt’s cattle, and having no station, started at once and took possession of Buchan in the end of 1838 or beginning of 1839.

“When Baylis got down he had to take Gelantipy. I had Buchan in 1845. In May that year I travelled through to Bruthen, and marked it. In November I cut the road and took down two bullock drays loaded with wool.

“The first time I ever went to Bruthen was in 1844 (in March). I had 34 men in the party travelling with 2,300 sheep, 220 cattle, 40 horses, and 4 bullock drays, and 1 horse cart; when we got to Numlamungee I heard the blacks were bad. I handed out the guns, 20 or 26. The men were boasting what they would do, because we had heard of so many frightful murders; but when we got to Bruthen they were all gathered together in the camp, and had piled their arms against a tree; it was a very hot day and the sheep were all camped. It was in the bend, between the Deep Creek and the Tambo. I told my blackfellow to pull his clothes off and come through the ferns; he did so, and yabbered some black lingo; every man jack bolted.

“When I came down into the district the blacks were very bad; we were the first who brought them in, in 1846; we caught about 40 at Buchan; my brother Norman and I and seven Omeo blacks surrounded them in the Murrindal River, just below the Pyramids. My blacks called out to them, and one of the wild blacks had a few words of English, as he had been to Maneroo—he called himself Billy Bradley. I killed a bullock for them, and they eat till they were sick.

“They did sheepwashing for me that year.

“Not one of these blacks had a scar on him; for a joke, I pointed out that my Omeo blacks had scars all over their chests and arms; I had a sharp butcher’s knife and marked Billy Bradley with two gashes below the collar-bone; no sooner had I done that than all of the others came up, one by one, dancing and slapping their shoulder and shouting “Budgery mak ’em ’quaintance;” not that they understood it, but repeating, like parrots, the words I used in marking Bradley. Every black I brought in I marked like this, and the Omeo blacks, at their own request, cut and scarred them all over. I do not know why they do this, excepting that the Omeo and Maneroo blacks say it keeps the cold out.”

All the country to the north and west of Melbourne has been explored ; it is easy to reach any part by coach or rail ; and from the official records in the offices of the Public Departments one can readily gather information relative to the rocks, soils, and mineral resources ; but Gippsland has been cut off from communication with the seat of government, and comparatively little has been published respecting its pastures, its mines, or its forests.

Mr. Alfred Howitt, in 1859-60, when he was the leader of a prospecting party in search of new goldfields, communicated, in exhaustive reports, very many interesting facts respecting the physical geography and geology of the midland parts of Gippsland ; but his labors were confined to an examination of the auriferous tracts in the basins of the Mitchell and the Dargo. Very little has been published descriptive of those large areas where it is probable settlers will select land ; and the facts we have collected will be interesting to many who are desirous of finding homes in a part of the colony where the heats of summer are tempered by the cold air of the mountains.

It is much to be regretted that so little is known of the meteorology of Gippsland. A few observations have been made at one or more of the points on the coast, but no information is obtainable respecting the climate of that part of Gippsland bordering on the Great Dividing Range. In that area there are rich soils, much of the land is well grassed, and the enclosures which we saw under cultivation presented the most favorable aspects ; and it is not creditable to the colony that vague and probably incorrect statements respecting the fall of rain, the temperature, and the occurrence of snow storms, cannot be met by an appeal to accurate records of the weather.

It is our duty to recommend that no time be lost in instituting a series of meteorological observations in Gippsland. Able and willing observers can be found in all the towns and settlements: and, with a little zeal at the seat of government, the work would proceed rapidly, and many of the representations which might deter settlers from occupying the higher lands, would, we are convinced, be proved to be untrustworthy or exaggerated.

The route pursued by us may be thus briefly sketched:—

We left Melbourne at 8 a.m. on Thursday the 29th January, and passing through Oakleigh, Dandenong, Berwick, Pakenham, and Buneep, arrived at Shady Creek on the evening of the same day.

At 6 a.m. on the 30th January we started from Shady Creek on our way to Sale, following the main road and visiting Westbury, Morwell, Traralgon, and Rosedale.

Throughout this part of the journey the scenery was in general tame and rather uninteresting. From Traralgon, however, we had a view of the Baw-baw Range, which is indeed a splendid feature in the landscape. It was not more than twenty-eight miles from us, but the smoke of bush-fires and the state of the atmosphere gave it the appearance of being far more distant, and consequently to our view, from the station we occupied, loftier than it is. Its height has not been measured, but we should suppose it is not less than 4500 feet above the level of the sea.

We reached Sale at 6 p.m. on the same day.

During Saturday the 31st January we examined some of the more interesting features in the vicinity of Sale; and at 6.30 a.m. on Sunday the 1st February we went on board the s.s. *Avon*, which conveyed us to Bairnsdale.

On our way we called at the Aboriginal Station on the River Avon, where we saw eighty-five natives.

These are under the care of the Board for the Protection of Aborigines, and their healthy and cheerful appearance, their cleanliness, and the condition of the station as a whole, which, with its pretty flower and fruit gardens, is an oasis in this otherwise unoccupied district, made a favorable impression on all the visitors. The Superintendent was very active in pointing out the improvements which had been made ; and we are convinced that the Board has in Mr. Hagenauer a most valuable officer. The education of the natives is carefully watched by him ; his assistants, we are sure, are earnest in their efforts to improve and elevate the young, and to lead them in right paths ; and what we saw of the results of the children's skill in various employments leads us to hope that ere long such establishments as this at Lake Wellington will not be required. The natives as they grow up will be employed by the whites, and they will carry to new situations the discipline and self-control which such unselfish laborers as Mr. Hagenauer are endeavoring to inculcate. We were much pleased with the general appearance of this well-conducted establishment.

At 4 o'clock we arrived at Eagle Point, where we stopped for a few minutes in order to get a view of the mountains on the north.

Bairnsdale was reached at 5.30 p.m.

We spent the greater part of Monday the 2nd February in examining the country around Bairnsdale. It is flat, but not uninteresting, as there are here some geological formations of the same character as those which occur near Melbourne and at Geelong.

Here, and at every other place at which we stopped,

we sought information from the Government officials and the local authorities respecting the character and capabilities of the country.

Having made all necessary arrangements for our ride over the mountains, we left Bairnsdale at 3 o'clock on the 2nd February, and arrived at Tambo at 6 p.m.

Our horses were in good condition, and we determined to make rather long journeys, in order that engagements entered into before we left Melbourne might be fulfilled.

We started from Tambo at 7 a.m., and passing through a district rich in soils and vegetation, reached Noeyang at 11.45 a.m. Some parts of the country from Noeyang to Ensay are all that a settler could desire, and much of it presents the appearance of being auriferous.

We arrived at Ensay at 6 p.m. on the 3rd February, and left at 7.30 a.m. on the 4th February, reaching Bindi on the same day at 1 o'clock p.m. At this point the party divided—two following the course of the Tambo for the purpose of making geological observations—and the rest taking the ordinary track to Omeo Station.

We arrived at Omeo Station at 7 p.m. on the 4th February, and left at 6 a.m. on the 5th February, reaching the township of Omeo at 10.45 a.m. We inspected some of the gold-workings in this highly interesting locality, and received much valuable information from the President of the Shire Council, the Secretary of the shire, and others, respecting the methods of mining for gold as practised at Omeo. We remained for a short time at the Dry Hill claim, for the purpose of seeing mining operations as there conducted by the proprietor, Mr. Fitzgerald.

All the way from Omeo to the Victoria River (Parslow's Inn) the country is very interesting, and in many

parts beautiful. The rocks, the trees, and the grasses, the contour of the lands, and the sharp contrasts as we passed from the creek-eaten hills, with their steep slopes, to the smoother unwatered tracts above, served to engage attention as we rode from point to point, measuring on the map as we went the miles of our progress.

Parslow's Inn is situated on the banks of the Victoria River. We arrived there at 7 p.m. The weather was charming, and it was delightful to feel the cool breeze that met us at this altitude after the fierce heat of the day, and to carry with us as we rode the scent of clover, and of flowering shrubs that here make the air heavy at times.

At 4 o'clock a.m. on the 6th the sky above was clear, the stars were bright and scintillating, but all around on every side there was a mist, and along the river a thick white shifting fog. Over a small waterfall, a short distance above the inn, the white fog rose as the smoke of a fire, straight upwards, and continued thus even after sun-rise. When the white fog was driven away from the river this smoke-like spire was seen high above the waterfall. The frost during the night had been intense. The ground and the roof of the house were white, and we enjoyed at this early hour the crackling of logs and boughs on the fire in our breakfast room.

Owing to the fog there was some delay in finding and bringing the horses to the house, but we were in the saddle by 6 a.m.

During the previous evening we obtained information from Mr. Parslow respecting the several routes over the mountains, and the facts we elicited left us in doubt as to the possibility of traversing fifty miles over such country as he described without the necessity of camping out. Our intention to pass over Mount Feathertop was fixed,

and all suggestions respecting the advantages of a more easy descent by way of Harrietville were put aside. We considered well all that we learnt, and we finally determined to attempt the journey as we had previously mapped it out.

We made a very early start from Parslow's Inn, and those in advance arrived at a small plain—known as the Flour-bag—at 8 a.m. From Parslow's to the Flour-bag there were some rough hills to ascend, but on the whole the journey was enjoyed by all. We dismounted and rested on the plain for a short time, in the belief that the members of the party behind would soon join us, but in this we were disappointed. One of the pack-horses—a horse that had carried His Excellency to Parslow's—and disdained any meaner employment—had bucked so viciously as to scatter the contents of his pack on the road, and we had to wait some time until the whole of the party was brought into order. We left Flour-bag Plain as soon as possible—sending the pack-horses in front—and we now really commenced the most difficult work that had yet presented itself. The “pinches” so called are very steep—and some of the heavy horsemen were unable to decide whether the inconveniences of the ascent or the descent were most annoying. In some places the track was strewn with loose fragments of rocks, it zig-zagged through masses of tangled scrub, and seemed now and again to be lost altogether—and to descend towards a point a thousand feet or more below. But willing horses and patient riders are not deterred by such difficulties. Good progress was made. At every point where it was possible to proceed rapidly we put our horses to their mettle; and in a short time we left the steep rocks and the crooked gums behind us, and found a

sideling road winding around the mountains, on the higher side of which there grow shrubs and flowers, and on the lower side steeps whose bases the eye could not penetrate—so far were they below us.

As we made the ascent towards Mount Hotham our attention was attracted at first by the rocks and the vegetation. We glanced now and again at the near and distant heights only to return to the examination of the strata, which are here well exposed by a sideling cutting along the slopes of the range.

The track beyond, which appeared in the distance as a yellow streak on the side of the mountain, was far above us, and we could only conjecture by what route it was to be reached. One after another of our fellow-travellers called out the names of well-known peaks as they appeared in view, and we made hurried guesses respecting the depth and trend of the ravines whose lower parts were lost to sight. On the right appeared a mountain rich in bossy sculptures that attracted all eyes. It glowed in the sun with all the brightness of the emerald, and over it—as it seemed like waves—flashed ever and anon pale tints of carmine and purple. In hollows on its flanks lay in patches herbage of a vivid green, showing where the snow had just disappeared—cradles of young glaciers, that can never mature. The high Bogong plains, separated from us by deep chasms and wide valleys, out of which arose solitary peaks and broken ridges, seemed, as we gazed on them, to be sleeping; the slopes were scored, but not deeply, the even line of the plain was not broken, and the light of the sun fell on them softly, not making deep shadows and showing sharp contrasts as in those parts where the denuding forces had worked fantastic hollows and carved long straight lines for the discharge of melted snows.

The Bogong plains were sleeping in the thin folds of pearl-grey and pale-purple mists that encompassed them ; and these mists hid from us Mount Kosciusko, Forest Hill, the Pilot, and the lofty ranges lying to the eastward. Towards the south, Tabletop, with his capping of volcanic rock, stood in the centre of an amphitheatre, and Mount St. Bernard and the Twins showed their peaks on the west. Rising to a greater height we beheld, on the north and north-east, all the lofty eminences whose springs feed the Murray, and we stopped here satisfied that nature could afford no grander spectacle. We took note of the character of the slopes, in many places precipitous, and falling in an even line three thousand feet into the stream-beds below. We observed the limits where the timber ceases to grow and where the shrubs give place to the snow-grasses. We examined through a field-glass the slopes on the mountains surrounding Tabletop, where appeared to the naked eye huge land-slips. These were volcanic cappings that had slid down the mountain, and—black and bare—they contrasted the rich colors of the adjacent parts unpleasantly. They reminded one of the works of man, which are rarely so guided as to add to the beauties of Nature.

We soon left the track and began to ascend a rounded smooth height, where beneath our feet there were small detached pieces of hard sandstone and slate, with snow-grasses growing up between. Before us appeared a small cairn or pyramid of stones—we reached it and knew it to be the summit of Mount Hotham. From this height even those familiar with the country expressed astonishment at the grandeur of the spectacle. The magnificent mountains, whose crests seemed to lift themselves as we ascended, appeared from this point, tier upon tier, far into

the blue distance. The deep gorges, almost lost in haze, as we gazed downwards, showed, through the haze, something of their gloomy recesses. Then came the thought that no mighty convulsions raised these monuments ; and the mind pained itself in contemplating the vast periods of time through which the aqueous agencies, the rain and the snow and the streams, had been at work in excavating the deep hollows, and carving the buttresses of the great hills. Yonder tiny rivulet, having its source in a spot which is usually white with snow, has cut that deep gorge, the spring at this point has worked a huge channel, and the running streams far below have broken through great masses of rock and shaped the mountains in the forms we see them.

The once vast plateau, which, during a late geological period, was slowly upraised from the sea to a height exceeding the altitude of any of the existing peaks, has not been violently torn by plutonic forces, but has yielded gradually to the influences of the weather, and has been slowly broken up by the rains and the brooks.

The narrow ridge extending from Mount Hotham to the western spur of Mount Feathertop was easily traversed by our well-conditioned horses ; the day was bright, the ground was dry, and we did not hesitate to proceed even briskly in places that in bad weather a timid horseman would not venture to approach. This ridge, indeed, is quite narrow enough and dangerous enough to try the nerves of even experienced travellers. In ascending it we were astonished at the effects of denudation in one place. A small peak in front of us, over the eastern slope of which we passed, presented on the western side what might be called a fracture—a fracture as sharp and as jagged as that of a piece of broken porcelain. We

passed over these lofty mountains in good weather—the sun was shining, and the snows that had lately covered the gulches had disappeared. In bad weather, in mist and rain, it is a dangerous pass. We have heard from many of the perils of the ascent. The sleet and hail sometimes blind the traveller, and he is lost if he fail to keep the narrow track. In winter, when snow falls, the drifts extend across the track—not parallel to it—and without care the traveller would touch a sideling and roll into a deep gorge.

The atmospheric effects during fog are, as described to us, altogether different from those observed in the Hartz Mountains, but as weird and eldritch. A man at a little distance is magnified, and he walks a giant. His horse is no longer a horse, but a huge creature of pre-adamite times. The shrubs are distorted and appear

“As strange phantoms rising as the mists arise.”

The peaks seem to shift their places, the path itself is apparently possessed of motion, and without an experienced guide and a fair share of courage the stranger might wander here helplessly until lost in the intricacy of the ranges.

On one of the slopes as we passed we found the skeletons of horses that had perished in the snows.

Not only in winter, but in all seasons of the year, these lofty heights are liable to be enveloped in mist, to be drenched with rains, or covered with a fair mantle of white snow.

We were fortunate in making the ascent when the weather was charming. The icy air that cooled our cheeks was delightful. We remembered, however, that

it might precede a change in the weather, which would altogether alter our plans for the journey.

We rested for about an hour at the Springs—the source of the Kiewa River—named by His Excellency, at your request, the Diamantina Springs—and thence pursued our journey to Bright, where we arrived at 7 p.m. on Friday the 6th February.

From Bright we proceeded by coach to Beechworth, thence to Chiltern where we found a special train in waiting for us, and reached Melbourne 10.30 p.m. on the 8th February.

SOILS, TIMBER, ETC.

Our route from Melbourne through Oakleigh, Dandenong, Berwick, and thence onwards to Mount Ararat, was wholly through alienated lands. The road is good, and we travelled rapidly; but, even with sufficient leisure, we could have made few observations respecting the soils and timber of this area that would interest the public. From Mount Ararat to the Buneep (close to the junction of that river with the Tarwin), a distance of nine miles, was over a granite country, Cannibal Hill, a well-known granite peak, showing rather boldly on the north. We observed in this part much spear-grass and swamp-hop, with fair splitting timber—peppermint and messmate on the ridges and small worthless trees on the flats. From Buneep, after crossing the river of that name, for a distance of three miles and a half along the Tarwin flats, the country is thickly timbered with peppermint, messmate, a few flooded-gums, and lightwood trees, with much scrubby undergrowth in parts. These flats are liable to inundation, but they would yield good crops. From the flats we commenced the ascent towards the older volcanic

rocks of Brandy Creek. For three miles and a half the same kinds of timber were seen, but the soil, perhaps, is not so good, and the grasses are rather thin.

Throughout this part of the route the view is circumscribed.

For a distance of eight miles from the part just described the road over the rich chocolate soil showed marks everywhere of difficulties met and overcome by travellers in wet weather—holes where wheels had been buried to the axle, and deep ruts partly filled with dust. The area of the tract occupied by older volcanic rocks in this locality is 53,760 acres. It extends as far north as to embrace the old fern-tree gullies, and southwards to McDonald's track, including the heads of the Moe and Lang-lang rivers. It is a jungle in which the traveller can make new tracks only with axe and bill-hook. The timber chiefly noted by us was white-gum on the ridges, and blackbutt (in other localities called mountain ash) with fine fern-trees in the gullies. The scrub seemed to be principally hazel, musk, wattle, and dogwood.

The extraordinary richness of the vegetation in this area caused us to make application to the Government Botanist for information respecting the more prominent trees and shrubs which completely cover these rich soils, and, excluding the smaller plants, amongst which are some rare genera and species. The list is as follows:—

Larger trees.—Called vernacularly "Whitegum-trees." *Eucalyptus coriacea*, *E. amygdalina* (var. *regnans*), *E. Stuartiana*.

"Blugum-tree." *Eucalyptus globulus*.

"Spotted gum-tree." *Eucalyptus goniocalyx* (sometimes passing as Blugum-tree.)

"Redgum-tree." *Eucalyptus restrata*, also more rarely *E. tereticornis*.

"Stringybark-trees." *Eucalyptus obliqua*, *E. macrorrhyncha*, the latter also sometimes passing as an "Ironbark-tree."

"Blackbutt-tree." *Eucalyptus pilularis*.

"Boxgunm-trees." *Eucalyptus melliodora*, *E. viminea*, and occasionally one with broader and grey foliage, *E. polyanthemus*.

"Blackwood." *Acacia melanoxylon*.

"Wattles." *Acacia decurrens* in various forms.

"Sassafras." *Atherosperma moschatum* (in the deepest gullies only, with also the following trees, which are not very large), *Pittosporum bicolor*, *P. undulatum*, *Persoonia arborea*, *Pomaderris apetala*, *P. elliptica*, *Zieria Smithii*, *Hedycarya Cunninghami*.

Shrubs of tall size or sometimes small trees: *Drimys aromaticæ* (Pepper-tree), *Exocarpus stricta* (Native Cherry, usually with pale purple fruit), *Prostanthera lasiantha* (Mint-tree), *P. rotundifolia*, *Hymenanthera Banksii* (Violet-tree), *Knuzea peduncularis* (tall Weeping Myrtle), *Callistemon salignus* (Bottlebrush), *Viminaria decumbens*, *Acacia suaveolens*, *A. linearis*, *A. verniciflua*, *Coprosma microphylla*, *Banksia Cunninghami* (Orange Honeysuckle), *Grevillea Barklyana* (our largest-leaved species and confined to the deep ravines of West Gippsland), *Correa Lawrenceana* forming with *Goodenia ovata*, *Daviesia latifolia* (the so-called Native Hop), *Acacia verticillata*, *Helichrysum ferrugineum*, *Melaleuca squarrosa*, *Leptospermum juniperinum*, *L. lanigerum*, *Veronica Derwentia*, *Rubus parvifolius* (the native Raspberry), *Banera rubioides*, *Aster stellulatus*, and some others in many places a large part of the dense underwood more or less entwined by *Ehrharta tenacissima* (the climbing grass), *Canliuia monophylla*, *Clematis aristata*, *Lyonsia straminea*, *Billardiera scandens*, *B. longiflora*, *Tecoma australis*, *Cassytha melantha*. *Myrsine variabilis*, *Panax sambucifolius*, and *Notelaea lignstrina* (the native olive) grow also into small trees, so also *Aster argophyllus* (the Musk Aster), *Senecio Bedfordi* (Duke of Bedford's tree). The Beech-tree, *Fagus Cunninghami*, occurs mostly in the higher valleys.

Heaths to be met with in these gullies: *Sprengelia incarnuata*, *Styphelia ericoides*, *S. lanceolata*, *Epacris lanuginosa*, *E. obtusifolia*, *E. microphylla*. Miscellaneous noteworthy plants from the gullies: *Sambucus Gandichandi* (native Elder), *Casuarina distyla* (the dwarf shrubby She-oak), *Pimela axiflora*, *P. ligustrina*, *P. pauciflora*, *Teucrium corymbosum*, *Fieldia australis* (parasitical on the fern trees), *Myosotis suaveolens*, *Cynoglossum latifolium*, *Veronica notabilis*, *Ily-*

drocotyle geranifolia, *Solanum aviculare* (the poisonous Gunyang or Kangaroo-Apple), *S. veseum* (the edible Gunyang), *S. armatum* (the Prickly Nightshade), *Mentha laxiflora* (Native Mint).

Among *Grasses* one is especially worthy of record : *Festuca dives*, which is limited to Victoria, and found only in gullies like these, but rising to twelve feet and more in height.

Remarkable *rushes* and allied plants : *Carex fascicularis*, *Lepidosperma elatius*, *Cyperus venustus*, *Galunia erythrocarpa* (very tall, with brilliant red fruits), *Dianella Tasmaniae*, *Restio tetraphyllus*, *Calostrophus lateriflorus*.

Great leafless *Orchid* : *Dipodium punctatum*.

Native *Iris* : *Diplarrhena Moræa*.

Ferns : *Dicksonia antaretica* (stout fern-tree), *Alsophila australis* (tall fern-tree), *Todea Africana* (square fern-tree), *Polypodium pustulatum*, *P. rugosulum*, *P. australe*, *P. grammitidis*, *Aspidium coriaceum*, *A. decompositum*, *Asplenium flaccidum*, *Doodia caudata*, *Blechnum cartilagineum*, *Lomaria Patersoni*, *L. fluvialis*, *L. lanceolata*, *Pteris incisa*, *P. comans*, *Davallia dubia*, *Trichomanes venosum*, *Hymenophyllum Tunbridgense*, *H. demissum*, *Gleichenia flabellata*, *G. circinnata*, *G. dicarpa*, *Tmesipteris Tannensis*.

When cleared of timber and brought into cultivation the whole of these lands will be highly productive. It would not be difficult nor costly to irrigate some portions; and, with ready communication with the markets of Melbourne, which the railway about to be constructed will afford, this and other systems of cultivation, requiring the expenditure of capital as well as labor, will, no doubt, be adopted.

In these soils is found a large earthworm, similar to that discovered near Turton's Creek. Mr. McCoy informs us that the name of this gigantic worm—often seen as long as four feet, and thick in proportion—is *Megascolex Australis* (McCoy). The only other known species of the genus has been found in hot-houses in England—supposed to have been brought in earth about the roots

of plants from the Cape of Good Hope, or from Ceylon or India. These were described by the late Dr. Baird. Our species is distinct, and is remarkable in having a peculiar smell like tar.

From the eastern boundary of the Brandy Creek lands to Shady Creek—four miles—we found rather thin loamy soils, with a sparse growth of wire-grass, the timber being principally stunted peppermint and messmate.

Crossing Shady Creek and ascending the spur towards Shady Creek Hotel, and thence thirteen miles to the Moe at Westbury, we saw no grass fit for stock. The timber is messmate and peppermint, of no value for conversion. The road for this distance crosses the heads of numerous small creeks and gullies, falling into the River La Trobe, which lies on the left at a distance of a mile or a mile and a half.

At the Moe Swamp we found growing on the flats small patches of good gum and lightwood. At the point where the road crosses the neck of the Moe Swamp a bridge is being erected, which, when completed, will greatly lessen the difficulties of this part of the road.

From Westbury, after crossing the Narracan Creek and the Shady Creek, and passing over the Haunted Hill, we reached the Morwell River at Morwell. In this tract, and that thence to the boundary of the surveyed lands in the parish of Traralgon, we noted soils of the like kind to those immediately west of the Moe, supporting not very good grass, and trees chiefly of the messmate and peppermint kind.

Two miles to the south of the main road at Morwell, and on the east bank of the river, settlement to a considerable extent has taken place, but with what results as regards cultivation we could not ascertain.

The route from this point to Rosedale and thence to Sale is not of an interesting character.

All the lands from Traralgon to Rosedale have been taken up, and from Rosedale to Sale the road is bounded on each side by lands purchased from the Crown.

The River La Trobe, from Traralgon to Lake Wellington, is bordered by extensive morasses, varying in width from half a mile to two miles, the aggregate area of which, up to the junction of the La Trobe and Thomson, cannot be less than 26,240 acres. These morasses are still in the possession of the Crown. Though they could be drained, so as in ordinary seasons to be valuable as pasture lands, they could not be cultivated with the certainty that the crops would be reaped. They are in all seasons liable to inundation.

In what manner such lands should be dealt with has from time to time engaged the attention of the Government; and in October 1865 a board was appointed to examine and report on these and other swamps in the colony, with the view of ascertaining how far and in what way they could be made productive.

From Sale to the River Avon, both on the north and the south, all the land has been alienated.

The soils of the tract lying between the La Trobe and the Avon, and those on the borders of the Macallister and Thomson, for a distance of sixteen miles from the point at which they fall into the La Trobe, are rich as compared with the soils covering rocks of the same age on the east and the west. This is due mainly to the character of the rocks whence the detritus and débris forming the soils have been derived, but in some measure also to the form of the basins of those rivers in their lower parts. Vast quantities of mud were spread over

those parts which in past times were again and again inundated.

The La Trobe and its tributaries and the Avon drain a large extent of country, and at one period their waters must have overspread the country for some considerable distance above Lake Wellington.

The country between Stratford on the Avon and Bairnsdale on the Mitchell consists of sandy ridges running S.S.E. to N.N.W., with stringy-bark on the ridges and scrubby gums in the hollows. The soils are for the most part inferior with the exception of a strip, some sixteen miles in length and five miles in width, bordering the lower course of the Mitchell, which is good land; but all this has been alienated.

From the junction of the La Trobe and the Thomson to Lake Wellington, a distance of nine miles, the river is fringed with a narrow belt of timber, reduced in places to single trees, standing some little distance apart, and has on each side a morass of an average width of a mile. The depth of the water in the river varies from fifteen to eighteen feet. This part of the La Trobe is not beautiful, but the rather dull green of the bordering morass contrasting the occasional patches of rich foliage on the banks; the flags and some flowering plants on the margin of the river, and the strong lights let fall suddenly where there were sharp bends, presented forms and colors not altogether unpleasing.

Where the river extends its delta into Lake Wellington the water is shallow, and the steamer left a well marked streak of mud-colored water behind it for some distance after we entered the lake.

The lake itself is shallow, there being not more than ten or twelve feet of water in the course pursued by us.

From the mouth of the La Trobe to the mouth of the Avon the distance across the lake is six miles. The outline of a low scrub-covered shore, and the still, rather muddy waters of the lake offered no subjects for investigation; the distance was hid from us by haze, and it was with a feeling of satisfaction that we entered the mouth of the Avon.

Following the course of this river for nearly three miles, through waters bright and clear, a contrast to the waters of the lake, we landed on the left side of the river, on a low bank, and proceeded to the Aboriginal Station. Here we found good land. On the south-west lay the Clyde Bank morass, as yet unimproved for all useful purposes. This tract, about 5120 acres in extent, is, like the morasses bordering on the La Trobe, still in the possession of the Crown.

Returning to the mouth of the Avon, we made a straight course for nine miles to Maclellan's Straits. On the northern shores of the lake we saw but low scrub and an uninteresting outline, and on the south side, dimly, a low fringe of tea-tree. Maclellan's Straits are about six miles in length, and in breadth three chains. Large tea-trees and lightwoods stand close down to the water, their rich green foliage overhanging it, and at each bend making pictures so full of delicacy and beauty that we regretted each one as it was passed only to wonder the more at the rare excellence of the coloring of those that succeeded it. The grace of outline and the contrast of colors in the foliage bordering these straits, the altered forms of the shrubs, and the softened colors in those parts where the waters reflected the foliage, struck each observer with astonishment and admiration.

The waters of Lake Wellington are fresh, those of Maclellan's Straits brackish in the upper part, and salt near Lake Victoria. In ordinary seasons the tide makes into Lake Victoria as far as the straits.

Though the waters of Lake Victoria are salt, we observed that they were discolored.

Our course, for a distance of eighteen miles, from Maclellan's Straits to McMillan's Straits, which separate Raymond Island from the main land, was nearly in a straight line. The low shores of Lake Victoria, and the great extent of smooth muddy water would have been well relieved by the mountain masses on the north and north-east, if the day had been clear; but the smoke of bush-fires and the thin vapours that overhung the horizon, almost entirely concealed these remarkable features. We caught glimpses, now and then, of lofty pale grey peaks whose names we could make out from the descriptions of our companions and by reference to the maps; but the exquisite views which are obtained from the lake in clear weather were hidden from us.

In passing through McMillan's Straits, we saw on Raymond Island a patch of land, some twelve or fourteen feet above the general level, with a sparse covering of crooked and weather-beaten white-gums. The straits are bordered with stunted timber; the shores are scrubby and low, and the aspect is uninteresting.

On leaving McMillan's Straits, we directed our course towards the entrance of the lakes, but when we were informed that an inspection of the works at the entrance would cause us to lose a day, and that on this day we would find no one to show us the works in progress, we reluctantly returned on our path and made for the mouth of the Mitchell. The distance from the eastern end of

McMillan's Straits to the mouth of the Mitchell is about three miles. Following up the Mitchell for four miles, we arrived at a bluff known as Eagle Point, where we landed in order to make barometrical observations, to examine the strata, and to obtain, if possible, a view of the mountains.

From Eagle Point to Bairnsdale the distance is six miles. The river varies in width from two chains and a half to three chains, and the water is clear and bright.

At Bairnsdale we landed on the same rocks that border the lakes on the west, north, and east. On the south the waters of the lakes are separated from the sea by low mud flats and sand-dunes, that are not, however, altogether unproductive, and in some parts present features far from uninteresting. At the entrance to the lakes some lands are occupied, principally, as we were informed, for marine residences.

The Gippsland lakes, as geographical features, are full of interest. Occupying extensive but shallow depressions in the great extent of level tertiary country which has its limits on the north as far as Kangaroo Creek, a tributary of the River Mitchell, on the west in the tributaries of the La Trobe, and on the east, at Ram Head, these waters may be regarded as similar to the pools that are left in the sands when the tide has receded. The laws which govern the flux and re-flux of tides do not, however, govern these. The waters have not diminished nor drawn back. The land has risen, and because of the rise of the land there are phenomena presented which the geologist may study with advantage.

The lakes are being gradually filled with mud and sediment ; and every year, with the advance of settlement, the work of filling up will proceed more rapidly.

According to an estimate we have made, the area of the lakes is 143 square miles; and the area embraced by the rivers and creeks draining into them 6059 square miles. In the summer season, or in seasons in any part of the year when there are no great floods, the work done by the rivers in conveying sediment into the lakes is inconsiderable, but in winter weather, or in any season when the rivers run bank high, great quantities of mud and silt are cast into the lakes.

Very remarkable changes have been made in Lake King. The Mitchell discharges its waters into this lake; and at one time the embouchure was about fifteen chains below the punt at Bairnsdale. At the present time the delta of the Mitchell may be said to commence there. The course of the river from that spot is nearly parallel to what must have been at one time the western shore of the lake, and the delta, or the river with its levee, is altogether ten miles in length.

From Bairnsdale to Eagle Point the course of the delta is south; thence it is north-east or towards the mouth of the River Nicholson, which also falls into Lake King. When the delta shall have reached a point within the influence of the storm-waters brought down by the Nicholson, a bar will be formed and the Mitchell will make an outlet towards the east. This will in time separate Jones's Bay from Lake King, and entirely alter the features which are now presented.

Another large river, the Tambo, is rapidly forming a delta in a direction towards Raymond Island, and thus, in time, there will be four separate lakes where there is now but one.

The work the rivers are doing is accelerated by the making of roads and drains, the ploughing of fields,

and by the tracks formed on the hill sides by cattle, all of which form ready channels for water in times of storm.

The width of the levee of the River Mitchell at its mouth is about five chains ; the width increases as you proceed up the river, and in some places it is as much as fifteen chains (seven chains and a half on each side).

From Eagle Point to Bairnsdale the river is bordered on the west by a morass which is separated from it only by a narrow bank, and on the east by a mound of rich soil which forms also the western shore of Jones's Bay.

In none of the rivers or straits was any current perceptible. We have had of late, not a drought, but much dry weather. For several months preceding our visit the fall of rain was inconsiderable, and the rivers were not discharging as much water as they do generally in the month of February.

The quantity of water which the rivers—their feeders—would pour into the lakes, during ordinary weather in the months of November, December, January, and February, is, according to estimates formed by us on data obtained by the late Mr. Dawson, 16,132,500,000 cubic feet, representing a depth of four feet and half an inch over the superficial area of the lakes ; and in these months the quantity of water evaporated would be certainly not less than 10,959,149,188 cubic feet.

These figures show that if the rivers had been discharging the usual quantities of water they would have presented a different appearance at the time when we visited them ; and the lakes, also, would have been unlike what we saw.

It is, however, not in ordinary seasons, but when bad weather and floods prevail, that great alterations are

effected at the mouths of the rivers and in the beds of the lakes.

We regret that we had no opportunity of examining minutely and carefully all the features presented in the beds and on the shores of these lakes. A chart showing the channels in the lakes, the mud and sandbanks which are constantly shifting, and the outline of the shores, which are also liable to change, would be of the highest interest to the geologist, and useful, too, to the navigator.

Along the shores of Lake King there were many plants growing that were new to us, and it is here the Government Botanist found some fine trees of *Acrornychia*, a genus known in Eastern Australia and New Caledonia, and remarkable for its splendid wood and the aromatic property common to this species.

Now that Gippsland is likely in reality to become a part of Victoria, and not, as heretofore, an almost unknown territory, and only in some sense related to it, we would suggest that a careful survey be made of the lakes and the morasses which lie adjacent to them, and that steps be taken to reclaim, if practicable, some of the thousands of acres of rich lands that are now liable to inundation.

The work of the survey of this tract should not be restricted to the laying down on plans of metes and bounds; it should be undertaken by an engineer, assisted by a geologist, and the objects should be the reclamation of the waste lands, the improvement of the channels and river courses, and the investigation of the forces now in operation which are gradually but surely altering the physical structure of the Lake country.

Such an enquiry would not be costly, and the results would be of incalculable value.

From Bairnsdale to Sarsfield, and thence to Tambo, we noticed some good country, in places well grassed and with good soils. The timber is chiefly stringy-bark, white-gum (ordinary Yarra or river gum), and some honeysuckle and wattle. The whole of the timber in this area is moderately well grown, indicative of soils that would repay cultivation.

From Tambo to Ramrod Creek we noted a prevalence of red-gum, apple-tree, stringy-bark, and a few iron-bark trees (here misnamed mountain ash). At Ramrod Creek there appeared, as well as those named, some peppermint and white-gums.

There are some small plots under cultivation in the valley.

On the Little Dick Range the timber is chiefly iron-bark and stringy-bark, with white-gum in the gullies.

At Monkey Creek the forest is thick, consisting of iron-bark, stringy-bark, white-gum, &c., with a plant widespread, known as native tobacco, the odour of which is very unpleasant. Here we noticed a beautiful climbing plant (*Kennedyia rubicunda*) which had twisted itself around the small saplings. It has a flower of a brick-red color.

On the track from Monkey Creek to Shady Creek we saw large white-gums in the gullies, a species of apple-tree, and some stringy-bark, and on the summit a good deal of stringy-bark.

Numerous large wattle-trees appeared in places, with a rather dense undergrowth of shrubs, the mint-tree, *weenth-kalk-kalk* (*Prostanthera lasianthos*), of which the natives make fire-sticks, being conspicuous amongst them. We noted here also a golden wattle with a foliage that, at a little distance, appeared of a slate color. It

very agreeably contrasted the olive green of the other trees.

From Shady Creek to Noeyang the forest presented the same general character until we approached the summit of the range. Within the granite tract the timber is smaller, and there appeared to be a larger proportion of box-trees, apple-trees, and white-gums.

From Noeyang to Navigation Creek we noted a prevalence of stringy-bark on the summit level, thence ascending the bed of that stream, to the foot of the Fainting Range, apple-tree and box on the slopes, with white-gum and peppermint in the narrow flats. The stringy-bark is found mostly on the southern slopes. It seems here to seek a place away from the direct influence of the solar rays.

Ascending the Fainting Range we observed a good deal of iron-bark with some apple-trees and box—the stringy-bark being rather thinly distributed. On these, the southern slopes of the range, the trees are larger, and the undergrowth of shrubs dense. From a sideling on leaving Navigation Creek, we saw some well-grown wattle-trees, reminding us of those which lend so much attraction to parts of the Yarra beyond Coranderrk.

After passing the summit of Fainting Range the trees are small, principally stringy-bark; thence to Sandy Creek the forest is open, almost parklike in places, with much apple-tree, box, and mountain white-gum, *Eucalyptus phlebophylla* (different altogether from the Yarra gum), and with large white-gums in the flats. The country is well grassed and very suitable for dairying purposes.

Onwards towards Reedy Flat the mountain white-gum prevails, with much yellow-box, apple-tree, and common box. The gum saplings are here a prominent feature.

As a rule the stringy-bark and iron-bark grow most luxuriantly on the southern slopes of these ranges : where at all exposed to the sun the trees are smaller, and they are seen but rarely in situations exposed to its full glare.

The forest from Reedy Flat to Ensay is composed almost entirely of apple-tree, box, and white-gum, stringy-bark appearing sparsely on the southern slopes.

All around Ensay we saw beautifully rounded hills, richly clad with grass that in the evening sun appeared of a brilliant sap-green and emerald-green color. The white-gums in the flats (which here take the place of the red-gum of the lower country) with their olive-green foliage, the rich colors of the well-grassed hills behind them, and the alternations of the colors due to the effects of light and shade, made pictures at every point which were delightful.

All the way from Tambo to Ensay we noted an improvement in the character of the country ; the grass was greener, the foliage of the trees was brighter, and the streams murmured and sparkled in their beds as we drew nigher to their sources.

There appears to be a very large extent of country in the neighborhood of Ensay which should offer great attractions for settlers, who could combine the rearing of stock with the cultivation of the land.

From Ensay to the point where the road crosses the River Tambo the country is good. The forest is comparatively thin, and is composed of box-trees, with apple-trees principally on the northern slopes of the ranges, and stringy-bark on the southern slopes. *Binnak* (white-gum) and a few yellow-box trees were seen on the flats and low down on the slopes. A few she-oaks appeared on the hills, and many very beautiful cherry-trees.

All through this district we observed that the hill box-tree grew principally on the slopes, and that the white-gums were always taller and smaller in diameter on the flats than on the slopes.

In the river marshes and morasses near Tongio, we saw on the borders a purple flower whose beauty and luxuriance were attractive in a place where bright colors are uncommon.

The Government Botanist informs us that it is known as *Lythrum salicaria*.

Up to the boundary of the limestone, box and apple-trees were numerous, but this tract as a whole is lightly timbered.

On the limestone hills around Bindi station there is no timber. The summits of the hills are quite bare of shrubs, but well grassed throughout. On the rises there are honeysuckles and she-oak, and on the lower parts clubby bushy-headed white-gums.

The soil at Bindi is very good, as appeared from the vegetation in the garden at the station, which was strong and healthy.

Advantage has been taken of the natural situation to bring into it, for purposes of irrigation, the waters of a neighboring creek; and, whether due to this or to the constituents of the soil, the result is surprising. The growth of the clover and grasses is extremely rich.

On our road to Bindi, our attention was attracted by the soils of the flats of the Tambo. The flats, which are about 1600 feet above the level of the sea, vary in width from a quarter of a mile to one mile, and they are covered with a considerable depth of excellent soil, which would well repay the labor and cost of cultivation.

From Bindi to Omeo station the road lies for one mile and a half over limestone, which, like that to the south, is generally bare of timber. There are a few honey-sneekles on the rises, and white-gums on the lower slopes of the spurs. The grass is everywhere good. On touching the granite the change in the character of the soil and vegetation was at once apparent. Here we saw stringy-bark, apple-trees (a few), box, and *binnak* gum on the river. Beyond the Sheepwash the box has taken possession of the slopes, and the contrast between the pale-green foliage of the *binnak* (the white-gum of the rivers), and the bluish-grey of the box was marked and striking.

Up to and beyond the summit of the Great Dividing Range, where along the ridges the bare rock is exposed, the prevailing tree is stringy-bark, with only a few mountain white-gums. The quality of the timber improves as you ascend, and many of the trees are of good size; but, on leaving the summit to descend, there is a rapid falling off both in size and quality. Indeed the good timber may be said to extend no more than half a mile from the summit level. On both sides of the porphyry slopes, towards Omeo station, there is an open well-grassed forest, with small white-gums and a kind of eucalyptus known here as Black Sally.

There are numerous springs of water on the slopes towards the Morass Creek, a tributary of the Mitta-Mitta, increasing in number with the descent, and forming into streams about half a mile from the ridge.

The area of well-grassed country in the vicinity of Omeo is not less than 80,000 acres. The plains—old lake beds—are destitute of timber. On the margin, and on the ridge dividing the plains there are a few small white-gums and saplings. On the banks on the western

side there are a few honeysuckles. Thence, towards the Mitta-Mitta, the country is undulating and well-grassed, with a few small gums. At Smoking Gully the forest of the southern slope consists of peppermint. At the foot of the slope, and also on the summit, there are white-gums, and on some of the rises she-oaks and honeysuckle. From Smoking Gully to Livingstone Creek the country is ridgy, in part undulating, but everywhere well grassed. The forest consists principally of white-gum.

The steep slopes around the township of Omeo are well grassed, and the timber—chiefly peppermint, a kind of box (new to us), and large gums in the flats—was everywhere healthy in appearance. Some small patches of ground enclosed for corn, near the creek, and the small gardens in the town, were green, and the growth of every plant seemed to be luxuriant.

Over nearly every part of the Omeo country we found kangaroo grass, in many parts high and thick, affording good feed.

The ridges and slopes from the head of Dry Gully to Victoria Creek are all well grassed. The forest is white-gum, with Black Sally in the gullies.

On all the southern slopes, from Dry Gully to Parslow's, we observed stringy-bark and peppermint, with rather poor grass. There is also much low wattle scrub and bitter-leaf, or native hop.

The northern slopes are not so steep as the southern slopes are, and they are not so deeply scored by the storm-waters. They are clothed with a thick sward of kangaroo grass. In many places we saw varieties of gum which we could not class.

We diverged from our path in order to see Victoria Plain. We saw it with the afternoon sun on it. It is

not flat, but slightly undulating; it is in the form of long low smooth banks or ridges, running parallel to each other, with hollows not so deeply sculptured as to become water-courses. The lights thrown across the furrowed surface—gilding the low ridges and leaving the hollows in shadow—lent a beauty to this sequestered spot which under other circumstances it might not present. Set in a frame of forest—itself destitute of timber and richly grassed—it made a picture altogether strange and startling, entering upon it as we did suddenly, and with no idea of the character of the landscape which was to open to our view.

The soil of this plain is said to be good.

Part of it has been selected. Altogether it embraces an area of 1500 acres.

Onwards, towards Parslow's, the grass looked poorer and the soils thinner. At Parslow's we found Black Sally in the flats and gullies; good grass and clover growing everywhere luxuriantly.

After leaving the Victoria River we passed through a forest for a distance of eight miles, consisting principally of Black Sally and mountain white-gum. As we ascended, the trees became smaller, and crooked and stunted; and on reaching a small untimbered well-grassed plain, known as the Flour-bag, the sub-alpine flora began to appear, and several specimens were collected.

Continuing the ascent, there appeared in greater prominence scrubs, small gum saplings, and a good many low distorted gums. On the volcanic plateau the gums were better; but here again there was found a rather irregular undergrowth of scrubs. Where the timber became smaller and thinner, the scrub and flowering

shrubs were higher and of better growth. Then the shrubs themselves became dwarfed, except in sheltered hollows ; and, finally, at 5500 feet, we emerged from the timbered land, and saw around us only snow grasses and small patches of low distorted scrubby bushes.

Not a blade of kangaroo grass was seen at any point above 5000 feet.

In the gorges and hollows, at this altitude, there are some sheltered spots where the shrubs are well grown.

Amongst the plants collected by us in our journey over these mountains, and examined by the Government Botanist, there are many rare and beautiful specimens.

On the Flour-bag plain we gathered an everlasting (*Helichrysum bracteatum*—Willdenow), whose brilliant orange blossoms overtopped the grasses, and mingling with the white cotton-like blossoms of the *Craspedia Richea* (Cassini) and those of the orange-tipped *C. Richea* (var. *Alpina*), made quite a garden on the skirts of the forest.

On Mount Hotham we found, to the exclusion of other plants, and growing thickly in patches, or sparsely amongst the loose stones, *Celmisia longifolia* (Cassini), with its greenish-grey leaves and yellowish almost thistle-like flowers ; the greyish-white *Antennaria nubigena* (Ferd. von Mueller), its blossoms tipped with a pale purple ; and in many places, but nowhere thickly until we reached the slopes, *Aciphylla glacialis* (Ferd. von Mueller). This plant belongs to the "Lovage" or Ligusticum tribe, and is, with a second species, peculiar to the Australian Alps. The Government Botanist thinks it might, perhaps, become available as an additional culinary esculent for countries of the cold zone. Horses are fond of this *Aciphylla*.

You noted this on the spot, and took away with you for examination a fruiting part of the plant.

Another specimen, also gathered by you, belongs to La Billardiere's *Pimelea ligustrina*, so named in the beginning of this century, when specimens were collected in Tasmania during Admiral D'Entrecasteaux's expedition. Yours is an alpine variety of that species. The fibre of the bark is of extreme toughness, and the whole plant is acrid ; but the bark can be utilized in medicine as a therapeutic substitute for the bark of *Daphne Mezereum*.

At the Diamantina Springs, and elsewhere on the slopes of the lofty ranges, we found, as well as the bright everlasting, everywhere growing in luxuriance and with the richest blossoms, the snow-white *Helipterum punctatum* (De Candolle)—a plant with flowers like a small marigold; *Senecio lautus* (Forster), the yellow *Euphrasia Scabra* (R. Brown), the blue-purple *E. Brownii* (Ferd. von Mueller), the rich green leaves and purple and yellow blossom of the *Brachycome ciliaris* (Lessing), the pale-yellow flower of *B. nivalis* (Ferd. von Mueller), the beautiful *Wahlenbergia gracilis* (Alph. de Candolle), and *Prasophyllum patens* (R. Brown).

Amongst other plants collected were *Stellaria pungens* (Brogniart), *Pultenea fasciculata* (Bentham), *Oxylobium alpestre* (Ferd. von Mueller), and *Orites lancifolia* (Ferd. von Mueller).

Nature in these regions has not been interfered with by man ; and yet there was something almost artificial in the aspect of the hollow around the Diamantina Springs. The richly foliaged shrubs seemed to have been set in their places in obedience to rules of art, and the flowers did not much mingle with each other. Through the thick

soft grass rose here a wide patch of rich purple flowers, there an irregular mass of white blossoms, and beyond a long bed of pink. On one slope the bright orange of a large everlasting prevailed, and on the opposite bank wide patches of white and red mingled with the vivid green of a plant like anemone. It would not be possible to find hollows and dells more richly adorned than those which here face the sun.

The grasses from Mount Hotham to and beyond the ridge leading to Mount Feathertop are thin and poor, as compared with those on the slopes, and, at one point, there is a rather thick scrub, with a few small distorted eucalyptus shrubs. Feathertop itself is moderately grassed, but there is no tree or shrub on it.

Making the descent from Feathertop towards Stony Creek we found no vestige of the snow-grasses after reaching the level of 5500 feet. Scrub and low bushes appear below that line, then a low eucalyptus scrub, like mallee, extending for a mile and a half, which gives place to distorted and crooked white-gum trees—small and low. The timber improves at every step in the descent after the scrub is left, until at length messmate is met with, which becomes larger and better as we approach a considerable belt of wattle-trees, at no very great elevation above Stony Creek. From that point to the river there is the ordinary gum, box, stringy-bark, and messmate forest.

Mr. Howitt communicated some curious facts relative to the distribution of plants foreign to Gippsland. He informed us that all along the paths over the mountains that are trodden by pack-horses there is a line of acclimatized plants, such as hogweed, clover, &c. The horses appear to carry the seeds of hogweed and a very little

Dutch (white) clover wherever they travel. Where bullock teams traverse, and along tracks where cattle are driven to market, clover and rye-grass spring up. Cattle from the Maneroo country carry clover and also the portulac of Central Australia (brought, most probably, from New England).

The introduction of foreign animals into Australia will, perhaps, influence the character of the country more indirectly than directly. The vegetation of vast tracts will be changed by the seeds distributed by them in their wanderings.

GEOLOGY.

The observations made during our journey have enabled us to correct some inaccuracies in the geological maps of the colony, and to indicate several new and interesting features in the rock formations.

The road from Melbourne to Dandenong is, throughout, over upper tertiaries, consisting of beds of coarse white and reddish-brown sands, in places consolidated, similar to those through which the railway from Melbourne to Brighton is cut.

At Dandenong we touched the great mass of ternary granite, which extends thence easterly for sixty-five miles to the watershed of the Thomson.

On our road to Berwick we observed a patch of upper silurian rock not shown on the geological maps, which appears to belong to a low range, in part covered by newer tertiaries, extending from the southern boundary of the granite to the north-western shores of Western Port Bay. It is, in fact, the remains of an old spur which

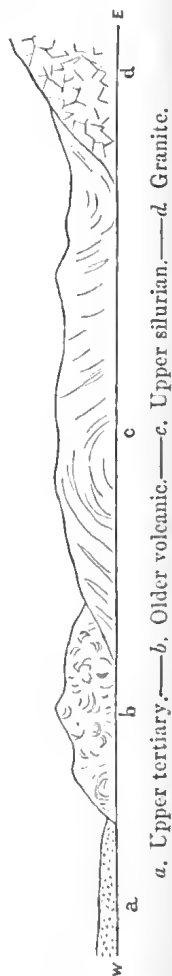
once connected the upper silurians which lie to the east of Mount Martha with those east of Berwick. When further explorations shall have been made in this tract, and the surveys completed, the connection between the auriferous upper silurians of the Yarra basin with rocks of the same age in Mornington will be established.

At Berwick we found a strip of country broken into well-rounded hills, and with very rich soils, altogether different in character to the sandy tertiaries. It is formed of a patch of older volcanic rock, similar in age and composition to that found at Essendon, Bacchus Marsh, Portarlington, Flinders, French Island, Phillip Island, and Griffith's Point.

A section near Berwick shows the rocks as represented in the woodcut.

The older volcanic rock is met with again about six miles east of Buneep, where there is a dense forest on deep chocolate soil as rich as can be found anywhere. The isolated patches which are found on the Macalister, and the large area occurring south of Tom's Cap (probably resting on mesozoic rocks, as at Griffith's Point, Bacchus Marsh, and Portarlington), would lead one to infer that it underlies to some extent the tertiary sands in the valley of the La Trobe.

There are not less than 88,000 acres of older volcanic rock exposed in Gippsland, every part of which is covered with a deep rich soil.

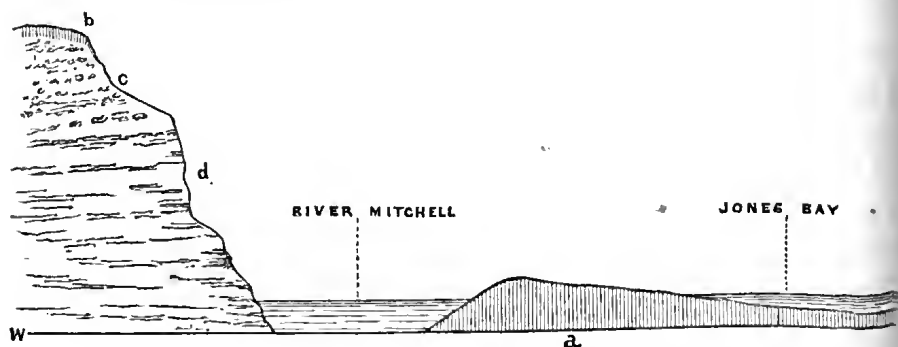


At McKirley's Creek, near Crossover Creek, about seven miles north of the Main Gippsland road, there are found beds of clay and quartz drift, and seams of lignite (brown coal), overlying a greenish-grey decomposed vesicular basalt, resembling, according to the descriptions furnished, that occurring north-west of Melbourne in the valley of the Moonee Ponds. The area over which the lignites extend is not known. As the beds are of considerable thickness, though variable in quality, they may become of commercial importance when the railway between Melbourne and Sale is opened.

From Westbury to Rosedale the upper tertiaries overlie mesozoic carbonaceous rocks, but we had no opportunity of examining the latter. To the north-eastward the mesozoic strata are said to overlie the upper palæozoic rocks. The exact relation of these formations to each other has not yet been worked out; and the key to some questions which have perplexed enquirers for a length of time will be found probably in the area here referred to. It is only in Gippsland that these formations are found to overlap. Elsewhere they are separated by masses of intrusive rock.

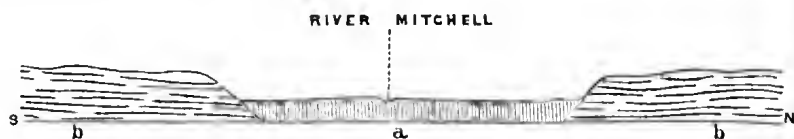
East of the great patch of older volcanic rock at Brandy Creek, and thence to Sale, we passed over loams and sands belonging to the later tertiaries. They are like the tertiaries of the Wimmera, and the soil is nearly as good in some places; but, unlike the Wimmera, the country is well watered. These tertiaries extend in an unbroken line from Brandy Creek (nine miles east of Buneep) to Ram Head, a distance of 182 miles, and in the aggregate (including the Lakes) cover an area of 2712 square miles.

The tertiaries of the River Mitchell are more interesting. At Eagle Point, on the right bank of the Mitchell, we found this section :—



a. River bank (alluvial).—*b.* Surface soil—sand and pebbles.—*c.* Compacted gravel beds—in places cemented by ferruginous infiltrations with pebbles of quartz—indurated slates, and porphyries.—*d.* Horizontal ochreous sand-beds (marine, probably upper tertiary).

Near Bairnsdale a section across the river shows the limestone on both sides :—



a. Flood-plain of river.—*b.* Bairnsdale limestone—marine (middle tertiary).

The area occupied by the middle tertiaries is about 37 square miles. They yield good soils, with an abundance of carbonate of lime.

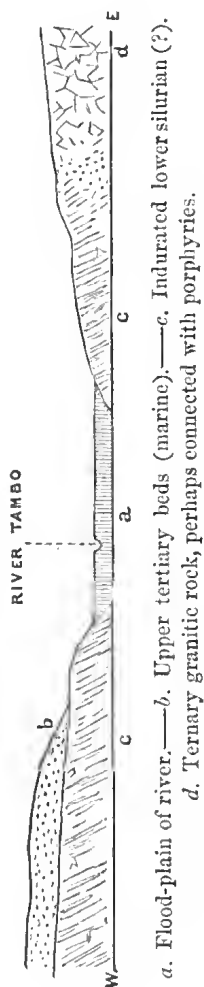
At Tambo we saw the last of the Gippsland tertiaries. Here we entered on a country occupied by older silurian, metamorphosed, and granitic rocks : there being apparently a passage from the sedimentary through the metamorphosed rocks to a ternary granite. Accurate surveys and a very careful examination of the rocks are

necessary to a right understanding of their relative positions. At this point, as elsewhere, we noted, however, what appeared to be a gradual change in the character of the strata : well marked sedimentary rocks of lower silurian age, becoming more and more schistose and gneissose, until finally the rock became granitic.

A rough section across the river from west to east was made hurriedly.

The height of the tertiaries above the river at this point we found by barometric measurement to be 104·1 feet.

From Tambo to Shady Creek our route was through a country occupied entirely by older silurian rocks, in places more or less altered, and with numerous veins of quartz. The country is exactly similar to that in which very productive quartz reefs have been found, and we are of opinion that there is here a very large area well worthy the attention of the prospector. The rapid rate at which we travelled prevented us from making careful observations, but those amongst us acquainted with auriferous tracts concurred in the views we have expressed. The prospecting of such a district could not be undertaken by poor men, as the cost of transporting materials and stores would be considerable. It might be advantageous to cut tracks in various directions, so as to connect the sources of the Nicholson and the Wentworth with Noe-yang ; but we are not in a position, from



the limited opportunities we had of inspecting the country, to say in what direction such tracks should be carried.

Some of the hills attain here a considerable elevation, showing rather sharp peaks.

A little north of Shady Creek we entered on a granitic area, and at Noeyang we found quaternary granite and felstone.

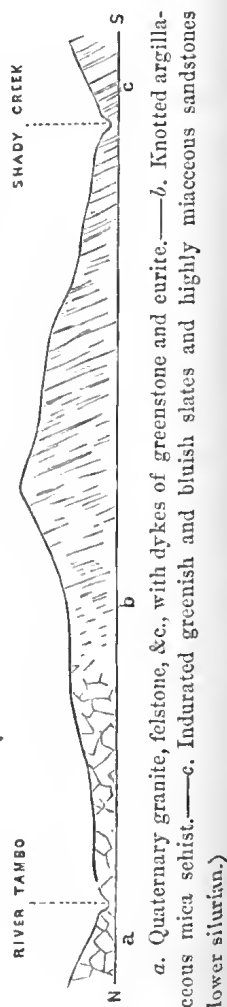
The section from Shady Creek to Noeyang is as follows :—

Seven miles north of Noeyang the road crosses the Fainting Range at a point about 250 feet below the summit. The rocks of this range, in places, are of somewhat similar character to those observed near Tambo, but on the whole may perhaps be regarded as metamorphosed lower silurians in the first and second stages of transition, and traversed by numerous igneous dykes.

Where the River Howitt joins the Tambo, we found in the beds of the rivers outcrops of rocks, consisting principally of gneissose granite, and gneiss passing into granite, and in the bed of the river boulders of granite with biotite, foliated schists, and masses of felspar and quartz.

Where planes of bedding were observable in the rocks *in situ* the strike was found to be N. 10° W., with a very high angle of dip.

In the boulders in the bed of the river we observed also masses of mica schist.



All our observations seemed to support the supposition that the divisions on the maps between the lower silurians, the metamorphic and crystalline schists, and the granites and porphyries, are not justified by the facts. It should be borne in mind, however, that no detailed surveys have been made in the area we traversed, and that, for all practical purposes, and exclusive of any theories of metamorphism suggested by the appearance of the rocks, the published maps are fairly accurate. We had very many opportunities of testing the correctness of the boundaries as laid down approximately in the geological sketch map, and, apart from the conjectures above referred to, they may be trusted as safe guides.

The observations made by us, though accurate as regards the sites visited, do not exclude the theory that the silurian rocks, the mica schists, and the granites are really and truly separate formations. Metamorphism along the lines of junction of such a character as to lead to the inference first referred to may consist with complete separation into distinct formations. We have given as clearly as we can the facts observed, but it is only by detailed surveys and sections, and by analyses, that the true geological and mineralogical character of the several rocks can be determined.

About four miles north-west of Ensay we were shown a vein of epidote rock (epidosite), a dense mixture of epidote and quartz with some flesh-colored felspar (orthoclase), occurring near the junction of the granite and metamorphosed schists. One other specimen picked up on the road in this locality was crystalline on the face of a joint in a granitic rock. The crystals are small, divergent, and in color pistachio-green to olive-green. The specimens have been placed in the collection of the

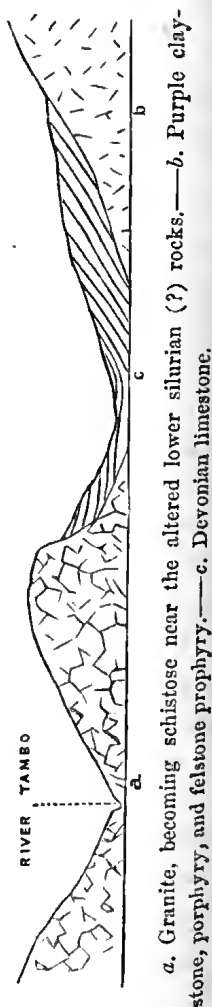
Mining Department. In a "wash-out" which exposed the underlying rocks, at a point midway between Reedy Creek and Smoking Gully, we found, within a tract marked on the map as occupied by metamorphic schist, strata bearing a resemblance to lower silurians. There were, first, fifteen inches of unaltered sandstone with thin veins of quartz; second, twelve inches of knotted argillaceous mica schist; third, a rather greater thickness of sandstone with thin veins of white quartz; and lastly, another layer of the same knotted argillaceous mica schist. The strike was N. 40° W., dip N. 50° E. 80°.

For some distance further our route was through altered lower silurian rocks, metamorphosed schists, and granitoid schists, until we reached a point three miles south of Bindi station, when we suddenly entered on the Devonian limestones. Well grassed rounded hills, with smooth slopes, and scanty timber of low growth on the lower parts of the rises, are characteristic of this formation. This limestone is fossiliferous.

A section through Bindi shows the rocks in this position :—

For the purpose of examining the so-called upper palæozoic rocks, one of us, in company with Mr. Alfred Howitt, left the party and followed the course of the Tambo for some distance.

Ascending the river, we found, first, a granitic rock, in places somewhat



a. Granite, becoming schistose near the altered lower silurian (?) rocks.—b. Purple claystone, porphyry, and felsite.—c. Devonian limestone.

schistose ; secondly, altered lower silurian strata, not showing a dip anywhere very clearly, massive and much jointed ; following this there was a considerable thickness of quartzite, and further up the stream we came upon very thin purple shales and reddish brown and purple conglomerates. In one place a distinct cleavage in the thin shales, at an angle of about 10° to the plane of bedding, was noticeable.

The time at our disposal did not admit of our ascending Mount Tambo, where rocks of a similar lithological character are said to dip at an angle of 40° .

As far as we can gather, no organic remains of any kind have been found in these rocks, and their position in the geological series is therefore unsettled. There appear to us no sufficient grounds for regarding them as the equivalents of the sandstones of the Victoria and Sierra Range. The resemblance is enough to deceive, and that is all. None of the sections shown to us enabled us to say in what relation they stand to the Devonian limestones. They may, for aught that is known to the contrary, be as old or older than the Devonian limestones.

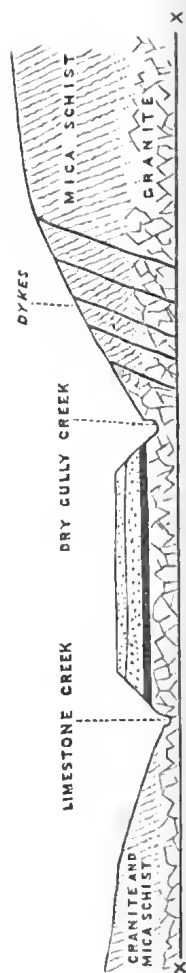
On regaining the track, we crossed a small tributary of the Tambo, and commenced the ascent of the Dividing Range. Here we found fine yellow and white mudstones, and yellowish-white sandstones, nearly vertical, and almost bare of soil. The age of these is as uncertain as that of the thin purple shales in the bed of the Tambo, and cannot be determined until the organic remains in them—if there be any—shall have been examined. The summit of the range was attained at 6.30 p.m. The reading of the aneroid at this point was 26.400 at 6.30 p.m. on Wednesday the 4th February.

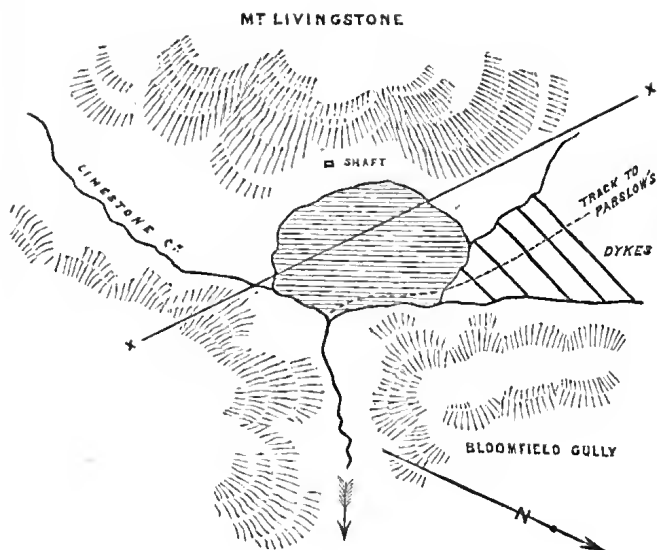
On descending the range we saw on the left, distant about a quarter of a mile and bearing S. 65° W., bold escarpments of porphyry. At Omeo station we found no outcrop of rock; but we were informed the lofty hills to the north known as "The Brothers," and distant about three miles, are of porphyry.

Travelling from Omeo station towards Omeo township, we passed over about eight miles of plain before we struck a low rise of metamorphic schist; and this rock, with variations in character and texture, was observed until near Omeo township, where a rather soft mica-schist is seen. It is well exposed in the road-cutting above and parallel to the river, just before reaching the township, and seems but slightly corrugated, and with less quartz than is common.

At Omeo we inspected Mr. Fitzgerald's Dry Hill claim, which is worked by hydraulic sluicing. The area already excavated is considerable, and the "face" appeared to us at least fifty feet in height from the first floor. The claim is so situated as to have a clear out-fall, and we were assured that the results are satisfactory to the owner.

The following section and plan illustrate the mode of occurrence of auriferous drift in this claim:—





The workings in this claim seem to be in the bed of an ancient tarn or mountain lake. The auriferous gravels, which consist principally of rounded fragments of gneissose and micaceous schist, granite belonging to this series, felstones, and greenstones, with a few boulders of upper volcanic rock, rest in tolerably regular beds on a false bottom composed of boulders of igneous rock (shown by a horizontal black line in the section). These boulders have been derived probably from a volcanic cap similar to those which occur *in situ* elsewhere in the neighborhood. The boulders are in every stage of decay, from exfoliation in concentric layers to kaolin or magnesian clay, varying from white to brown in color, and in touch from harsh to soapy and tenacious. The beds of the old lake are now eroded on three sides, and the surrounding hills are degraded. The mica-schist of the eastern side, which forms the area around Livingstone township, is

wearing down more rapidly than that on the western side, which is gneissose and granitic, and comparatively hard.

At least four *leads* of different periods occur in Livingstone Creek, and probably five or more ancient lake basins—all of which have been drained by the creeks having cut through the lower rims—except one, the Livingstone Swamp.

Miners possessed of the same knowledge and skill as the owner of the Dry Hill claim would probably find in the streams in this tract of country similar lake basins with the like auriferous gravels; and the plan and section we have given may perhaps assist prospectors who see these formations for the first time.

The sculpturing of the hills on the right as we ascended the steep from the bed of the creek at Dry Hill claim, on the road to Parslow's, was so remarkable as to attract the attention of all. The range, with a generally even slope to the creek, is carved as if by art. Small watercourses, active only during rains, at almost equal distances apart (perhaps not more than 200 or 300 feet), running straight down hill to the creek, have cut hollows in the range, and from hollow to hollow there is a smooth curve. The effect is grotesque; and it is perhaps only in mica-schists of similar character, and in the same situation, that the like symmetrical arrangement of buttresses can be observed.

Ascending the hill from the creek we saw the same rather soft mica-schist as we found on approaching Omeo, but here and there occur intrusive dykes or intercalated layers of a hornblendic rock.

Further on we noted knotted argillaceous mica-schist, with veins of hard dense white quartz, not as yet proved

to be auriferous; and, after crossing a narrow strip of granite (sketched on the map we carried with us), we entered on slightly altered sedimentary rocks (probably lower silurian), which continued for about four miles. Following this we found a granitic rock which extended westwards along our route for about eight miles to Parslow's Inn. On leaving Parslow's the ascent was over mica-schist, with veins of hard dense white quartz, to the "Flour-bag," a small well grassed plain where occur newer volcanic rocks. On leaving this plain the mica-schist again appeared for a short distance, and thence to the heights, near Mount Hotham, we travelled over plateaux of volcanic rock overlying lower silurians.

One singular feature in the landscape we had no opportunity of examining closely—Mount Battery—which, as described by Mr. Howitt, is a truncated cone, about 800 feet above the river, and standing out from a somewhat lower ridge which connects it with the main water-shed between the Cobungra and Bendarra rivers. From a distance it has all the appearance of an extinct crater; but the summit shows that it is not a crater at all. It is a narrow ridge of columnar basalt, part of one of the extensive outflows of lava found on the summits of these mountains. The conical appearance is due to the gradual wearing away of the mount, and the slopes westward to the Cobungra are covered with broken fragments of volcanic rock of all sizes, all derived from the columnar basalt. The prisms are seen protruding at all angles from the broken stones near the summit, and on the lower slopes the pressure from above has pushed the prisms of basalt outwards. Although no traces of a crater are visible, it is quite possible that this may have been a vent. If so, the upper portions of the cone have been removed

by denudation. The denuding forces have operated here energetically, and it is no cause for surprise that craters are no longer to be found.

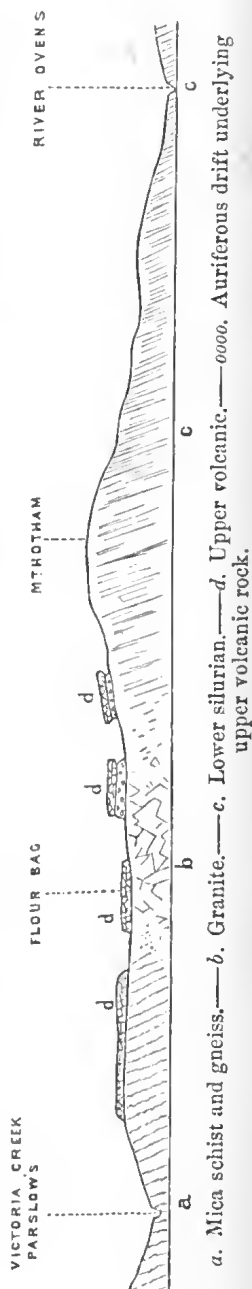
It was highly interesting to us to note the character of the volcanic rocks in this area; and it was with regret that we had to leave it without examining the volcanic breccias on the slopes of the mountains, the cap of Tabletop, and the lake that lies at its base.

The volcanic rocks thin out as the summit of the range is reached, and on Mount Hotham we found only lower silurian rocks. On the road to Mount Hotham we observed fine sandstones, shaly and slaty mudstones, and silky shales, but nowhere did we see any graptolites or other organic remains.

From Mount Hotham to Bright our route was wholly over lower silurian rocks.

The following is a rough section of the rocks exposed between Parslow's and the River Ovens:—

We had the opportunity of examining many parts of this section very carefully, and it is certainly suggestive of important changes in the physical structure of the country since the period of the overflow of the volcanic rocks.



The geology of the tract of country between Bairnsdale and Bright presents many features of interest. We find near Bairnsdale, and throughout the area surrounding the lakes, upper tertiaries apparently of the same age as the marine beds at Flemington, the palæontology of which has been investigated by Professor McCoy. Next succeeding these are marine beds with numerous fossils of the same character as those found at Curdie's Creek (west of Cape Otway) and in a cliff between the Lakes Bullen-Merri and Gnotuk in the Western District. Mr. Howitt has examined these beds very carefully, he has collected a great many fossils, and he is of opinion that they are the equivalents of the middle tertiaries of the western parts of Victoria.

Northward from the northern margin of the tertiaries we enter the great trough of silurian rocks and metamorphic schists. We have stated already the conclusions we have formed respecting these and the gneissose rocks, mica-schists, and granites with which they are associated, but we are bound in duty to add that a cursory examination of them, such as we made, is not sufficient to enable us to give opinions of any great weight or value. Mr. Howitt is now surveying, and mapping on the scale of forty chains to one inch, considerable areas in this part of the province, and we must wait for the results of his labors for a solution of many difficult questions discussed by us on our route. We saw some of the maps and sections in course of preparation by Mr. Howitt, and we are confident that this work could not be placed in better hands. As well as a "good eye for country," the capacity to class and correlate observations over a wide field, he has also a correct knowledge of the mineralogical com-

position of rocks, and by constant reference to authorities he can place each one in its proper place.

From Tambo to Parslow's we passed over a large area in which thousands of feet of rocks, originally deposited as sedimentary beds, and appearing in many parts as sandstones and mudstones, were in other places metamorphosed, becoming first indurated with more or less of hydrous magnesian silicates in the planes of bedding or cleavage, then schistose, and finally passing into granitoid rock and granite. Again, we noted vast masses containing abundance of magnesia-mica, the whole indicating changes—mechanical and chemical—which must have taken place when these rocks were subject to great heat and pressure. That there should be so much feldspar and mica in the altered rocks is no matter for surprise when the mineralogical character of the typical lower silurian rocks is considered. They are not, as a rule, very silicious, but rather argillaceous.

The volcanic rocks met with between Parslow's and Mount Hotham are of singular interest. We saw no signs anywhere of any crater or cone. All that remains is a capping here and there on lower silurian rocks, with some thickness of auriferous gravel between the volcanic rock and the upturned edges of the silurians. The sources whence the lava flowed appear to have been obliterated by the denuding forces at all times active in these lofty regions.

At what time within the recent tertiary period was this lava erupted? Is there any connection between it and the lava flows of the western plains? And what was the physical geography of the country when the volcanoes that gave forth streams of lava over the once great plains,

now nearly altogether eaten away, were burning mountains, making ruddy the skies above them? These questions will perhaps be settled when the geology of this tract shall have been carefully investigated.

An account of a journey through Gippsland would be incomplete unless reference were made to the metalliferous minerals, ores, and coals which are found in this part of the colony.

Osmiridium—a metal belonging to the platinum group Osmiridium.—has been collected in small quantities near Stockyard Creek. A few days before we commenced our journey some of this metal, in rough grains, was sent to the Mining Department for analysis by Mr. Reginald A. F. Murray, who is now engaged in making a geological survey of south-western Gippsland. It is not probable that this metal is very abundant, but its occurrence in any locality is worthy of record.

Long before this sample was received, Mr. Patterson, the assayer for the Bank of Australasia, had obtained specimens, and had made known the fact that osmiridium was to be found in the colony.

Before Mr. A. W. Howitt undertook the task of opening Gold. up the goldfield of Gippsland, there were not more than 50 persons engaged in gold mining. At the present time there are 1581 men employed in alluvial mining, and 943 in quartz mining. These, with the aid of machinery of various kinds, of the aggregate value of £144,588, raise yearly 70,000 oz. of gold.

The area of auriferous ground actually opened up, but not at any one time wholly occupied, is 148 square miles, and the number of reefs proved to be auriferous is 461. The tracts within which the already discovered alluvial workings and quartz reefs lie are comparatively small in area ;

they are, however, spread over a vast extent of country, and each one is remote from the other. During our journey we passed over hills and valleys of lower silurian age that are undoubtedly auriferous ; we saw the volcanic plateaux underneath which lie gravels already yielding gold ; and we are convinced that, with the extension of prospecting operations, new and rich fields will be opened up by the gold miner both on the west and east of the Tambo, as well as on the flanks of the Great Dividing Range.

We have in another place recommended that tracks be cut for the purpose of facilitating explorations in these parts of Gippsland.

Silver.

Argentiferous galena is found in the limestones in the basin of the Snowy River and in other localities towards the north-east.

From the Dargo River, the Dargo High Plains, the Thirty-mile Creek, and Donnelly's Creek, ores, some of them pyritous, have yielded as much as 18 oz. of silver per ton.

Tin.

Black oxyd of tin has been found in the basin of the River La Trobe, near Mount Fatigue, and near Corner Inlet. Nearly all the areas occupied by granite yield more or less of tin-ore ; but up to the present time very little has been done in Gippsland towards the collecting and saving of this valuable product.

Copper, lead
antimony,
&c.

All that is known to the Government officials in the Department of Mines respecting the occurrence of the ores of copper, lead, antimony, zinc, the metal bismuth, the ores of manganese and molybdenum, have been already communicated to the public in various reports, and it is only necessary to direct attention to these, where the prospector will find recorded the results of careful

analyses, and also particulars relating to the working of the mines.

The ores of iron are abundant in many parts of Gipps- Iron-land.

From Bennison's Flat, near Foster, samples of brown iron-ore have been obtained, which gave on analysis—

Metallic iron	...	61.4 = 87.72 Fe_2O_3
Silica	...	12.1

Titaniferous iron-sand is widely spread in some parts along the coast, and good samples have been got near Wilson's Promontory and in other places adjacent.

When we were at Eagle Point we saw the Mount called Nowr-nowr. According to the descriptions furnished by Mr. Howitt, it is a hill of porphyry, traversed by dykes resembling elvans, and abuts on clay slates of lower silurian age. On the silurians there rest the equivalents of the Bairnsdale limestones (middle tertiary), and above those newer tertiaries. Great quantities of micaceous iron-ore are found with the elvans and distributed through the porphyry. There are large blocks of ore on the southern slopes which Mr. Howitt says are of good quality and clean. There is a gentle slope for about a mile and a half, from the top of the Mount to Boggy Creek, an arm of Lake Tyers, where there is water deep enough for good sized vessels. From this point to the entrance of Lake Tyers the distance is sixteen miles, and by land to the entrance of the great lakes four miles.

There is said to be an abundance of limestone close to the mount, and plenty of timber suitable for charcoal.

A specimen of this ore was sent to the Department of Mines and analysed. The report was not favorable. The sample contained a good deal of quartz; so much,

indeed, that in smelting the iron would combine with the silica and form a slag.

If the ore can be obtained pure, or free from an excess of silica, the iron-smelter might make an experiment at this place with every prospect of success.

The creeks near Nowr-nowr flow over a solid mass of red jasper, and some of the fragments in the creek are as bright as vermilion-colored sealing wax.

Precious stones are found in Gippsland; but no systematic search has been made for them.

At Stockyard Creek, specimens of the emerald, topaz, and zircon, have been collected; and sapphires have been obtained at Cross-over Creek, Upper Boggy Creek, in the basin of the River La Trobe, and in the basin of the Tarwin.

As far as we have been able to ascertain, no carbonaceous rocks different in age from those occurring at Cape Patterson and Cape Otway have been discovered; and no seams of greater thickness than those already opened in the western fields.

It is not at all improbable, however, that the equivalents of the Tasmanian *Glossopteris* beds may be found on the north-eastern side of the great area of carbonaceous rocks that extends from Griffith's Point to Tom's Cap. If they occur here at all they will be explored with difficulty, as there is a considerable thickness of newer rocks to be pierced before they could be reached.

We have appended to this report a Table showing the extent of the areas occupied by the several rock formations, and some account of the character of soils belonging to each, and also the barometrical observations recorded at various points between Bairnsdale and Myrtleford.

The Omeo Plains, though lying at a great elevation, will hereafter be profitably occupied. They consist of elevated land, with a climate not unlike that of the south-western counties of England, but perhaps more severe during two or three of the winter months. The soil is a deep, dark-colored, somewhat tenacious clay, producing a luxuriant but rather rank vegetation. The climate is too wet and too cold for sheep of the merino breed, and fluke, a disease very destructive among these, is said to prevail throughout the district. The pastures of the plains, in their unimproved state, are unquestionably better adapted to the grazing of cattle than sheep; but if subdivided and brought into cultivation, the long-woolled breeds of Great Britain would undoubtedly thrive admirably upon them. The climate and the soil give reason to hope that a proper system of rotation cropping would be found to be practicable which in many other districts of the colony, owing to the uncertainty of the weather, could not be carried out profitably. Root-crops, which are indispensable to proper rotation farming, and the successful breeding of long-woolled sheep, could be grown there from year to year without fear of failure through drought. It is a district that, probably, would be found better adapted to systems of husbandry resembling those of Britain than any other parts of Victoria.

The extensive swamps in Gippsland could be drained and sown with suitable grasses. Thus treated, they would make good feeding grounds in summer, and become available for the support of stock when other parts were dried up. They are not fit for growing grain, but from no fault of the soil; the crops might be lost in consequence of their liability to rust and other fungoid

diseases. Root-crops and potatoes, however, might be grown in such low lands with profit in all ordinary seasons.

In the lower parts of Gippsland, as a rule, the growth of grasses for the support of stock should be encouraged ; but there are many localities where the hop and such fruits and vegetables as are successfully cultivated in the southern counties of England might be introduced with profit and advantage.

In concluding this Report, which is a hastily written record of observations made during a very rapid journey, we have to express our regret that many subjects of great importance are treated briefly, and some not touched upon at all. If we had had leisure and opportunities for following up lines of research that presented themselves frequently during our tour we could have given information that would have been of practical importance to the agriculturist and the miner. We trust, however, that we have noted some valuable facts, and that what we have collected may lead to a thorough examination of a part of the colony that, both as regards its geology and its features generally, is full of interest.

Gippsland, when there shall be easy communication between its central parts and the metropolis, will afford, both to farmers and miners, many new fields for the profitable exercise of their energies ; it will, in future years, support a large population ; and in its mountains and lakes the careworn inhabitants of the cities will find health and recreation.

It combines in its varied landscapes all that is attractive to the artist and the traveller ; and even if it were not rich in mineral treasures, and if it afforded no certainty of

profit to the grazier and the farmer, it should still be our duty to bring it, as soon as possible, into close connection with other parts of the Province.

In pursuing our enquiries in Gippsland we received aid and information from all to whom we applied, and to Mr. Alfred W. Howitt, the Police Magistrate and Warden at Bairnsdale, we are much indebted for help.

We have the honor to be,

Sir,

Your most obedient servants,

A. J. SKENE,

R. BROUGH SMYTH.

GIPPSLAND.

AREAS OF GEOLOGICAL FORMATIONS.

	square miles.	acres.	
1. Upper Tertiary, including Lakes	2,712	1,735,680	Where not covered by sand-dunes, light moderately good soil; at some distance from the sea (where there is less sand), fit for wheat. All kinds of root crops and maize grow well in these soils with proper treatment.
2. Middle Tertiary ..	37	23,680	Much lime in the soil. Yields excellent crops. Hops, fruit trees, and vegetables of all kinds grow well.
3. Oolite (carbonaceous)	1,531	979,840	Soils similar to those of Barrabool hills, Wannon district, and Cape Otway. Deep rich soils in the valleys. In Gippsland this tract is generally heavily timbered.
4. Upper Palaeozoic ..	687	439,680	Soil sandy, gravelly, and poor. Grass moderately good. Stringybark on the hills, gum and box near the rivers. Pitt-sporum and other umbellaceous trees in the deep gorges of the Mitchell, with curryjongs, &c.
5. Devonian ..	65	41,600	Limestone hills with good soil. Scarcely any timber.
6. Upper Silurian ..	1,736	1,111,040	Ranges with thin soils. Deeper and better soils in the flats.
7. Lower Silurian ..	3,543	2,270,720	Ranges with thin soils. Good soils in the river flats. Grass thin. Stringy-bark, iron-bark, and scrub.
8. Metamorphic ..	235	150,400	Rugged ranges. Wherever the country is at all level the soil is good and highly productive.
9. Newer Volcanic ..	279	178,560	Soils like those of Keilor Plains and the Werribee, but in Gippsland these tracts lie at a great elevation.
10. Older Volcanic ..	138	88,320	Soils very rich and deep like those of Moonee Ponds and part of the Bacchus Marsh district. The timber and scrub dense.
11. Trap	1,275	816,000	Mountains rugged and rocky; bare of soil in places; elsewhere soil poor and gritty. Grass of medium quality; in the best parts, kangaroo grass; in poor places, wiry and in tufts. Timber according to elevation and aspect. Mountain white-gum on Black Mountain tableland, with stringy-bark and peppermint in the gullies. Near the Snowy River, in deep valleys, box and apple-tree. As a rule the trap country is not scrubby.
12. Granite	1,655	1,059,200	Light sandy soils. Open forest. Moderately well grassed. In places timber heavy.
Total	13,898	8,894,720	

BAROMETRICAL OBSERVATIONS.

3rd February 1874.

	Bruther, 5.50 a.m.	At Hotel	Bed of Tambo	Hotel again	Difference, using means	McDougall's, Noeyang, 11.45 a.m.	Near Summit of Fainting Range (add, say 250 feet, for summit level), 4.20 p.m.	inches.
	30.010
		30.020
			30.105
				30.040
				075
					29.490
					28.530

4th February.

	inches.
Mr. Birt's house, Bindi, 12.50 p.m.	28'445
First hill after leaving Tambo River, 5.20 p.m.	27'700
Summit of Great Dividing Range, on track to Omeo, 6.30 p.m. ...	26'400

Thursday, 5th February.

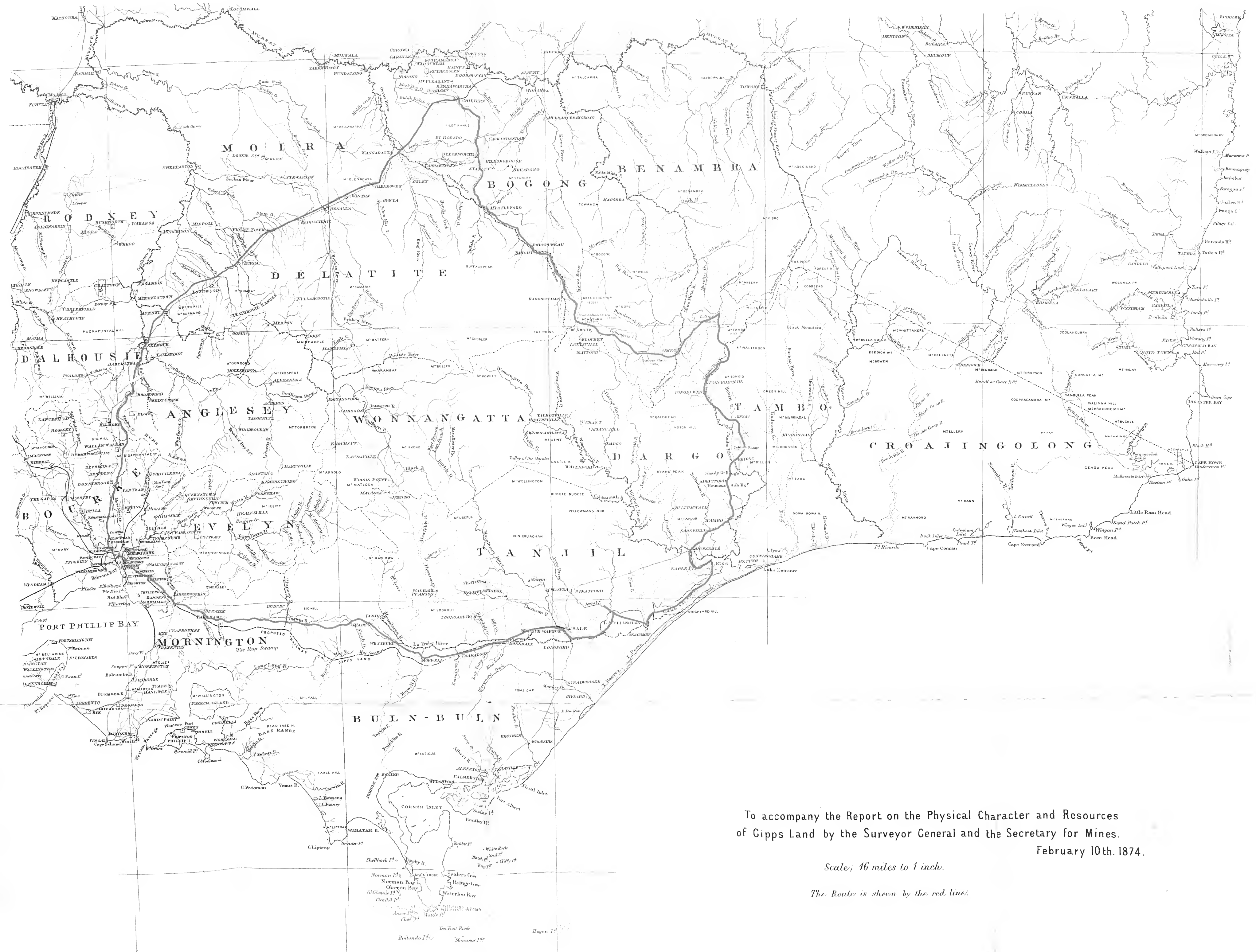
Omeo Station, 5.45 a.m.	27'265
Omeo Township, 10.45 a.m.	27'540
Bed of Creek above Omeo, 4.25 p.m.	27'425
Parslow's, 7 p.m.	26'400

Friday, 6th February.

Parslow's, 4 a.m.	26'425
Flour-bag (Grassy Plain), 8 a.m.	25'060
Baldy (Mount Hotham), 12.10 p.m.	23'850
Diamantina Springs, 12.30 p.m.	24'288
Road over Feathertop (highest point of road about 800 feet below summit of Feathertop), 3.45 p.m.	24'175

Saturday, 7th February.

Bright, 8.25 a.m.	28'725
Myrtleford, 2 p.m.	28'960



To accompany the Report on the Physical Character and Resources
of Gipps Land by the Surveyor General and the Secretary for Mines.

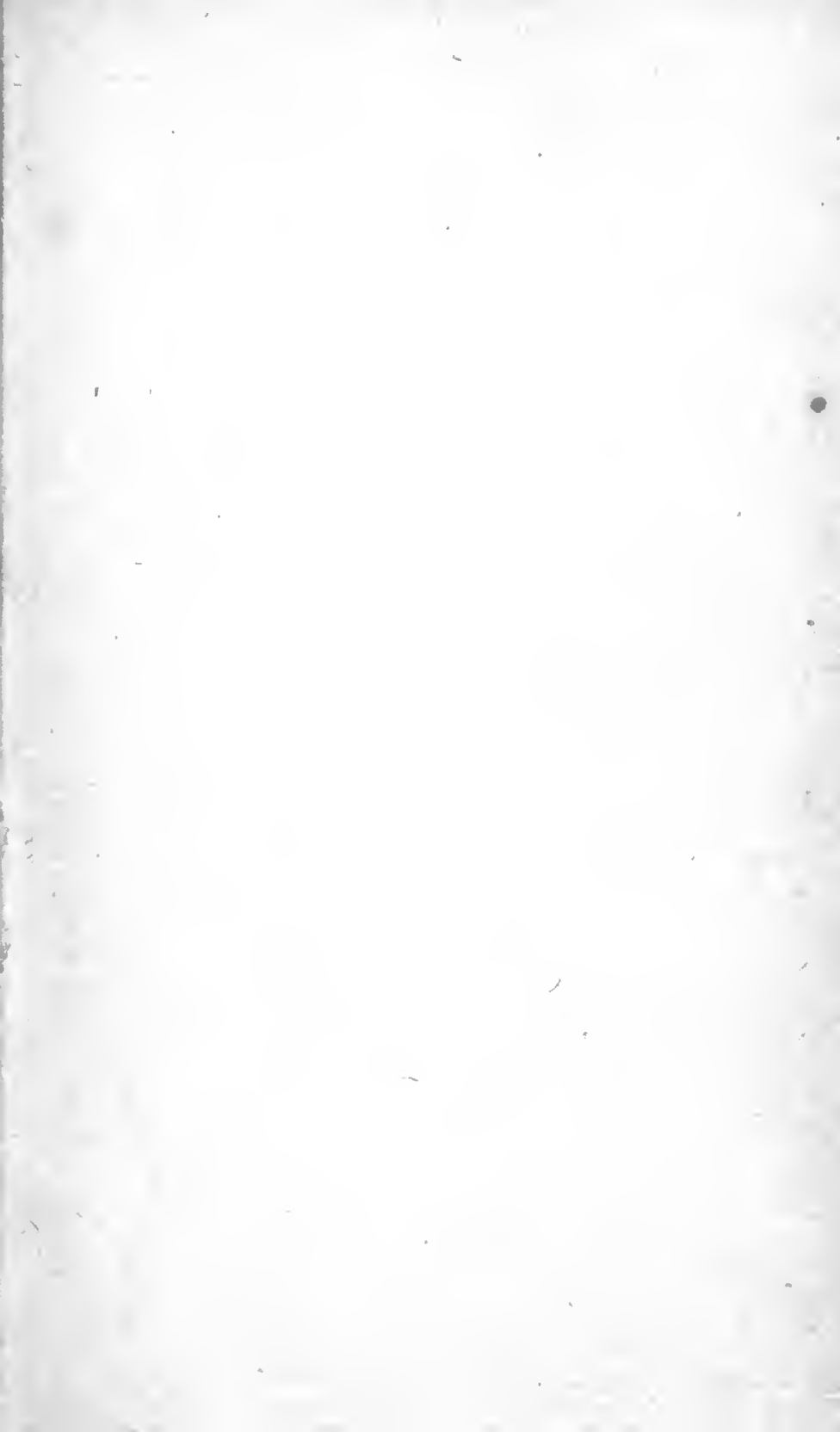
February 10th. 1874.

Scale; 16 miles to 1 inch.

The Route is shown by the red line.



SKETCH OF A GEOLOGICAL SECTION FROM BARNSDALE TO BRIGHT



559.456

Feb 7

925

C

